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Engagement and Development of Professional Skills Among Low-Income, High-Achieving Students: A Structural Equation Model

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Engagement and Development of Professional Skills among Low-income, High-achieving Students: A Structural Equation Model

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Abstract

This dissertation tested the effect of academic engagement and social engagement on developing soft professional skills for low-income, high-achieving students in higher education. Using the publicly available data of GMS scholarship, the analysis was consisted of EFA and SEM. The general effect model gave a general idea about the tested population, whereas the conditional model highlighted the groups' specific significance. Low-income, high-achieving students continued their academic and social engagement growth during their school years. Academic engagement positively enhanced students' soft professional skills for students who did not receive the GMS scholarship, students from educated and uneducated parents, Asian and Hispanic students. Those who received the GMS scholarship and African Americans' academic engagement did not affect their soft professional skills development. The social engagement did not relate to soft professional skills by any means in the data. Challenges in the first year of college negated the effect of social and academic support on developing soft professional skills for students with GMS scholarship and whose parents are less educated. Limitations of the study have been emphasized, and suggestions for future research were provided.

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Chapter One: Introduction

High-achieving, low-income college students have unique characteristics that make them special. They have the features of students with low-income socioeconomic status, but they are distinguished by achieving higher than average students. Since Tinto (2006) highlighted the lack of research concerning their presence in college; more research has centered on serving underrepresented students in higher education. Higher education institutions use students' engagement as one of their success indicators. Researchers have found that students' engagement inside and outside classrooms has a positive effect on their development and success during their higher education journeys (Astin, 1999; Engle &Tinto, 2006; 2014; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008).

The learning environment has a significant impact on students' success (Astin, 1999; Tinto, 2006). Astin (1999) asserted the importance of studying the college environment in higher education research. He believes that traditional research, which tends to ignore students' experiences in college, treats the college environment as a black box. Therefore, Tinto (2017) suggested increasing the college sense of belonging for students by promoting students' academic and social engagement on campus. As Astin (1999) explained, increasing the time students spend on-campus increases their social and academic engagement. Perhaps, because of the extended time students spend on campus, they feel a part of their campus communities, which is reflected in engaging in various forms of college activities. It is important to help low-income students by providing extra

support to increase their sense of belonging. Tinto (2008) advised the following: providing better support for low-income students; encouraging low-income students to better prepare for college by taking advanced classes in high school; encouraging engagement in college activities; increasing transferable credits to the four years of college; helping with college re-entry; reinforcing the motivation for workers to go to college, and providing support programs to ease the transition.

Astin (1984) suggested that students' development is a product of incorporation of their inputs and their exposure to the college environment. He believes that the extent of students' personal development is directly related to the quality and quantity of engagement in campus activities. His definition of involvement is "…the amount of physical and psychological energy that the student devotes to the academic experience" (Astin, 1999, p. 518). He used the word "involvement" in his theory to include engagement such as attaching oneself to an activity or organization, committing oneself to participate in, etc. Astin believes that the amount of student involvement reflects the improvement in developmental outcomes. His theory of involvement can be summarized as what students bring with them before college is the input to students' involvement. These inputs affect students' development outputs moderated by the college environment. These relationships can be emphasized as: Input → Environment → Output.

The input is the background students bring, such as race, GPA, or family influences. The environment is everything students experience in their time on university

campuses. As an outcome, those inputs and environments produce changes in college students. Mayhew et al. (2016) divided these relationships into two parts: First, the general effect that connects the environment to the outcome, and, second, the conditional relationship that treats the input of student background as conditions for their development.

This study follows this organization for studying students' general skills development as a product of the exposure to the college environment, including challenges, support, and engagement as a general relationship. The study also will assess the conditional effect to study the invariance of the proposed measurements due to obtaining the Gates Millennium Scholars Program (GMS) scholarship, parents' education, and race. The Bill and Melinda Gates Foundation developed the GMS to help a specific group of low-income students who achieve high scores. To be eligible for a GMS scholarship, students must be African American, American Indian/Alaska Native (First Nations), Asian American, Hispanic/Latino, or of a Pacific Islander background. They must attend college full-time. They must maintain a GPA of at least 3.3 on a scale of 4.0. In addition to that, they must participate in community service, extracurricular, or other activities (Bill & Gates Millennium Scholars Program Gates Foundation, 2019).

Research found that the GMS scholarships helped low-income, high-achieving students attend four years of college and helped them attend prestigious private universities (Davis, Nagle, Richard, & Awokoya, 2013; Hu, 2010). The scholarship

promoted a higher level of academic and social engagement compared to non-scholars (Boatman & Long, 2016; Hu, 2010, 2011). Recipients engaged more in educational activities outside of the classroom and in community services (Boatman & Long, 2016) such as volunteering and cultural events (DesJadins, McCall, Ott, & Kim, 2010).

GMS scholarships positively helped low-income, high-achieving students develop leadership skills and have higher aptitude to accept leading positions in the future (Hu, 2011). This research will look at another type of developmental skill: soft professional skills, which are reflected by analytical skills, oral communication, working independently, writing clearly, and the ability to adapt to change. Engaging in academic and social activities such as volunteering may increase these soft professional skills (Khasanzyanova, 2017). Research finds that students can learn those soft professional skills through volunteering in social events (Khasanzyanova, 2017) and participation in academic activities and training sessions (Keow, 2019). DesJardins, McCall, Ott, and Kim (2010) showed the effect of GMS scholarships on reducing working time for low-income, high-achieving students. With less working time, students can spend more time engaging on campus either socially or academically (Astin, 1999, DesJardins et al., 2010). Therefore, it is of interest to assess the association between social and academic engagement and the development of soft professional skills for low-income, high-achieving students.

Since educational institutions prepare students for their professional workplaces, the development of students' competencies is a crucial task. Research showed that, in many cases, soft professional skills surpass the technical or hard professional skills because of the importance of clarity in communication and adaptability of change (Lohan, 2015). Therefore, it is vital to embed these soft professional skills in university educational and noneducational activities (Keow, 2019).

Byrne, Weston, and Cave (2018) suggested that the lack of development in soft professional skills is caused by the lack of students' aptitude for learning these skills. Therefore, it is important to include soft professional skills in various university's activities. Ngang, Chan, and Vetriveilmany (2015) proposed some ideas to overcome this problem. Because some of the soft professional skills take a long time to develop, professors commenting when students fail to utilize the skills throughout class projects and activities may help with improving these skills. Soft professional skills should be integrated into the curriculum of teaching hard professional skills classes, and teachers should add them to the grading system. To ensure the development of soft professional skills, universities are encouraged to utilize developmental models that embed these skills in all educational aspects. This requires supporting instructors themselves to help them develop plans to increase teaching these needed skills.

DesJardins and McCall (2014) found that parents of low-income, high-achieving students contributed financially less than students who did not receive the GMS

scholarship. However, the more educated the parents, the more support they gave to their children in terms of college choice and information about higher education (Engberg & Allen, 2011; Hoxby & Turner, 2015). Knowing that parents' education can change the support they may provide to their children on college decisions, it may also influence low-income, high-achieving students' social and academic engagement and the development of soft professional skills. Therefore, this research study will assess factor invariance based on parents' level of education.

Research noted culturally diverse students can differ in their attitude across GMS scholars and non-scholars (DesJardins et al., 2010; Hu, 2011). DesJardins et al. (2010) found that African American students used the spare time in extracurricular activities and volunteering more than other racial groups. On the other hand, Hu (2011) found a cultural difference among GMS students in their attitudes toward self-efficacy on leadership skills. Asian Americans were more likely to choose the middle choice on a Likert scale (Hu, 2011; Wang, Hempton, Dugan, & Komives, 2008). These results suggest a need for assessing differences across racial groups.

This study aims to develop a measurement model for items asking about academic and social engagement and the challenges low-income, high-achieving students face during the first year of college using exploratory factor analysis. It also tests the fit of the measurement model for both academic and social engagement using confirmatory factor analysis. How the support that those students receive affects their engagement is also of

interest. The study examines the effect of all college environment variables (i.e., challenges, social and academic engagement, and support those students receive) on the development of professional skills due to studying in college. The analysis will utilize a structural equation model to incorporate information from both measurement models. Additionally, the researcher will conduct invariance analyses to assess the effects of GMS scholarship, parents' education, and ethnicity on model structure. To do so, the data will be divided randomly into two halves. The first half of the data will be used for exploratory factor analysis, and the other half for confirmatory factor analysis and the rest SEM analysis.

This study aims to help practitioners in higher education in general, especially practitioners in students' development, understand the effect of students' engagement in higher education on developing soft professional skills. Based on this understanding, they can develop more effective programs that help low-income, high-achieving students improve their soft professional skills. More specifically, this research provides a general understanding of the effect of engaging socially and academically. The study also provides a specific understanding of these effects on developing soft professional skills for the specific groups based on receiving the GMS scholarship, parents' level of education, and their race. This will help practitioners develop specific programs depending on their conditions.

Problem Statement

Hu (2010) found that low-income, high-achieving students tend not to go to highly selective colleges when they receive the GMS scholarship. They do not apply to these selective colleges. There is only about 2.5% of high-achieving, low-income in the population (Hoxby & Avery, 2013). Therefore, these students do not receive as much attention from researchers in comparison to average-achieving low-income students (Andrews, Imberman, Lovenheim, 2020; Hoxby & Avery, 2013). The GMS scholarship program is considered an excellent stimulus for low-income, high-achieving students because it provides significant financial help for their higher education. This program gives researchers the ability to conduct research using the GMS data. Hu (2011) studied the effect of the GMS scholarships on developing leadership skills and students' ability to obtain a leadership position controlling for social and academic engagement. However, this study concerns general professional skills as an outcome controlling for social and academic engagement. The present study intends to investigate the effect of students' experiences, including challenges, engagement, support, and their role in developing general professional skills at the measurement level using confirmatory factor analysis (CFA) followed by structural equation modeling (SEM). Several invariance analyses will be used to assess group differences based on obtaining the GMS scholarship, parents' level of education, and race. The research bases of these invariance analyses are the differences that were found previously across GMS scholars and non-scholars (Boatman

& long, 2016; DesJardins et al., 2010; DesJardins & McCall, 2014; Hu, 2010, 2011) and across race (DesJardins et al., 2010; Hu, 2011). Additionally, DesJardins and McCall (2014) found that parents of the GMS scholarship recipients contributed financially less than non-recipients in their children's education. Since Engberg and Allen (2011) and Hoxby and Turner (2015) noted parents' level of education affected on their college choice. An invariance analysis might highlight differences in the proposed model.

This work builds on Hu's (2011) work that assessed the contribution of social and academic engagement in building leadership skills and obtaining a leadership position after graduation. The focus of this research is to understand the role of exposure to the environment of higher education represented by engagement, challenges, and support in building soft professional skills. The research also focuses on the item level of GMS data using SEM techniques, whereas Hu's (2010; 2011) work only assessed item data using EFA.

Purpose of the Study

The purpose of the study is to develop and test the fit of a measurement model and then to examine the relationship between social and academic engagement and general professional skills for low-income, high-achieving students in higher education using EFA, CFA, and SEM. The model investigates the effect of challenges these students face in the first year of higher education on their social and academic

engagement. The model also investigates the effects of those constructs on social and academic engagement in the third year of college as well as the effects of social and academic support they receive. The model incorporates those constructs' total effect in developing general professional skills. All those relationships represent the general effect of the measurement model. After testing this general effect, multiple invariance analyses will investigate the conditional effects of obtaining GMS scholarships, parents' education, and race on the general effect model.

Research Questions

The research questions of this study consisted of three parts. The first part is the modeling part, which explored how variables build each construct. Then, because this research uses SEM for analysis, it is important to assure that the analysis models are correct models by looking at the fit indices. Secondly, because Astin (1999) conceptualized the development that happens in students resulted from the exposure to the university's environment, the general effect addressed students' experience in college on developing soft professional skills. The directions of relationships for the environmental factors follow what were found in the literature. Lastly, the literature found some variation in students' development based on obtaining the GMS scholarship,

race, and parents' education. The conditional effect questions investigated these potential sources of variations. Therefore, the study addressed the following two questions:

1. General effect
    1.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?
    1.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?
    1.3. How did low-income, high-achieving students encountered challenges in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?
2. Conditional effect (factorial Invariance Analysis)
    2.1. Did the provision of a GMS scholarship or the lack of such assistance affect the proposed general effects of the development of soft professional skills for low-income, high-achieving students?
        2.1.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

2.1.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

2.1.3. How did challenges that low-income, high-achieving students encountered in the first year of college affect their soft professional skills development? Does social and academic support mediate this relationship?

2.2. Did parents' education influence the proposed general effects of the development of soft professional skills for low-income, high-achieving students?

2.2.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

2.2.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

2.2.3. How did challenges that low-income, high-achieving students encountered in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

2.3. Did race influence the proposed general effects of the development of soft professional skills for low-income, high-achieving students?

2.3.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students from different races?

2.3.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students from different races?

2.3.3. How did challenges that low-income, high-achieving students from different races encountered in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

Chapter Two: Literature Review

Introduction

Students' engagement in higher education as an indicator of success is a heavily researched topic. During the last decade, many theories were posited. Each of these theories focused on higher education from a different angle. Based on these theoretical frames and models, extensive research has examined the quality of higher education life and quality.

The Bill and Melinda Gates Foundation acknowledged the importance of this specific population when it initiated the Gates Millennium Scholars Program (GMS) to help the population of low-income, high-achieving students to receive a better education. The foundation started the GMS program in 2000, and every year 1,000 students benefit from it. This study highlights this population, and it builds a conceptual model that considers students' engagement, parents' education, challenges, support, and skills developed from attending college. The objective is development and testing of a comprehensive model to better understand this community.

Alexander Astin (1999) defines student involvement as the "quality and the quantity of the physical and psychological energy that students invest in college experience" (Astin, 1999). As students spend more time at their institutions, physical and psychological engagement will reflect better developmental outcomes. Even if students

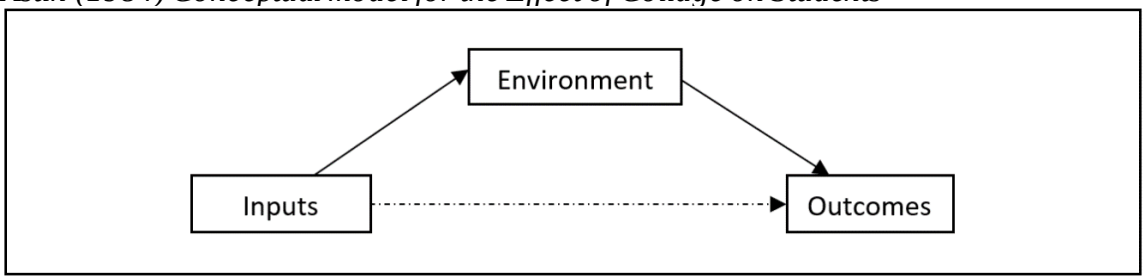
worked on-campus in work-study positions, participated in tutorial sessions, or engaged in research activities, the time they spend connected with the university environment will increase the intended outcomes from attending college. In contrast, the time and efforts students spend on the subject matter reflect their performance in their classes. Students who spend more time with their friends and their social life spend less time on their coursework. This reflects the performance differences between the two groups. Astin developed his theory of involvement on five postulates:

1- Involvement is the physical and psychological energy that students invest in education.
2- Involvement is subject to change over time and subject matters.
3- Involvement must be measurable in both quantitative and qualitative ways.
4- Students' development correlates with the amount of involvement invested.
5- Institutional policies should aim to increase students' involvement.

Astin (1984, 1999) proposed a conceptual model for understanding the influence of college on students (Figure 1), as Mayhew et al. (2016, p. 2) presented in the third edition of their book. The model has three elements, which are: inputs, environment, and outputs. The input element includes all characteristics and experiences that students bring with them when entering college. The environment element consists of all efforts that universities provide in the educational system. Finally, the outcomes element is what students gain from college experiences such as attitudes, developments, and behavior.

Generally speaking, students' growth gained during college is enhanced by the interaction with the college environment. For example, the involvement with the class materials reflects the learned knowledge about the subject matter and better satisfaction. Behavior and attitude acquisition during college are enhanced by involvement with peers (Astin, 1984).

Figure 1
Astin (1984) Conceptual model for the Effect of Collage on Students



Mayhew et al. (2016) built on Astin's (1984,1999) work by using an improved approach that has two levels of relationships, general and conditional. The general relationship describes the relationship between college environments and outcomes. The conditional relationship, however, studies the connections of the inputs and the environment-outcomes relationships with environment moderating the effect of students' inputs on the developmental outcome. On the other hand, in the traditional research paradigm the relationship between students inputs and their developmental outcomes is a "black box" without looking at the effect of college environment (Astin, 1999).

In this research, I will use Mayhew's et al. (2016) approach in studying the challenges low-income, high-achieving students face in the first year of college and the support they receive regarding social and academic engagement as the elements of environmental factors. The study treats the soft professional skills that those students develop as the outcome from exposure to the college environment. The environmental factors and the outcome variable represent the general relationship model. The input factors in this study are the parents' level of education, receiving a scholarship, and race, which I will treat as conditional relationships. Parents' level of education and ethnicity are input factors since students do not have control over them. Receiving a GMS scholarship also fits in the input as it is an external factor over which colleges do not have control.

Student Engagement

Colleges and universities use students' campus engagement as an indicator of educational system success. An increase in students' engagement reflects the dynamic relationship between students and their schools. Hence, it is essential to acknowledge how engagement is defined. Christenson et al. (2008) described student engagement as the efforts students spend in learning, connection, belongingness to school, and participation in the initiation of activities in the institutional environment in order to achieve an academic outcome. Student engagement is widely defined to include students'

commitment to learning. It includes emotional feelings toward education and how students feel connected to their schools. In addition to that, participation in academic activities inside and outside of class can be a part of engagement as well. When students feel connected to the school and love the fact that they are a part of their school, they may put more effort into their education. All of this results in students feeling as if they are a part of the educational system. This can be an indicator of the success of an educational program (Christenson et al., 2008).

Willms (2003) provides another definition of student engagement at school, which is "the extent to which students identify with and value schooling outcomes, and participate in academic and non-academic school activities" (p.8). This definition focuses more on student self-identification with school goals, both academic and non-academic. The overlap between academic and non-academic goals is noticeable in the two definitions; hence both types of engagement occur on educational institution campuses.

For this research, I differentiate between the two types of student engagement: academic and social. I define academic engagement as physical, emotional, or cognitive behavior directly related to achieving educational advantages (e.g., cognitive behavior on school material, engaging in group project assignments, or communicating with instructors for academic purposes). On the other hand, social engagement refers to human communication behaviors that occur on an educational institute campus but are not

directly related to academic goals. Examples include social activities, cultural events, and helping other students on campus.

a. Social engagement

Van Den Wijngaard, Beausaert, Segers, and Gijselaers (2015) defined social engagement as "an attitude of responsibility, rather than a specific act or knowledge, which will take the form of applying one or more capabilities to the benefit of the collective, beyond individual gain" (p. 706). In an assessment for a conceptual model using confirmatory factor analysis, Van Den Wijngaard et al. (2015) assessed and validated the influence of institutional mission, curriculum, and pedagogy on social engagement in the higher education context. The analysis found that four conditions may affect social engagement: political interests, social analysis, valuing applicability, and self-efficacy. It appears that these four elements contribute to better social engagement. When institutions control and adopt political regulations, students feel safer and act more comfortably. When students have the skills of social analysis, they are better able to assimilate into the social environment. Valuing the importance of communication inside the college enhances students' participation in social activities on campus. Finally, self-efficacy makes students feel engaged.

Gregorutti (2015) suggested using strategies to enhance interaction or engagement among university students. First, universities should create an alternative reward system

that provides time and resources for innovations that have social benefits. Second, universities need to promote a proactive approach for community engagement through enhancing a realistic understanding of communities, utilizing the university-communities service approach. Third, the university-service-learning approach provides a real-life-problem tool to improve learning. Fourth, universities must adjust their curricula to the needs of students and their future careers. This contribution to students' lives and society could enhance higher education outcomes. Lastly, universities may develop new proposals that include a set of missions to overcome issues that may affect their reputation. These proposed policies could increase value and social engagement while enriching higher education training.

Swanzen and Rowe (2013) developed a multi-dimensional conceptual framework in South Africa that can be integrated into higher education within the concept of community engagement. Under the understanding of community engagement as the collaboration of work within a social group that shares similar characteristics, curricula are most beneficial when they are built to benefit both students' goals of learning and serving community needs. Various studies in the literature (Cherwitz, 2010; Swanzen and Rowe, 2013; Gregorutti, 2015) noted that students engage more in the curricula when they feel that they can benefit their communities. Therefore, professors are encouraged to guide the student to do class projects that are directly applicable to their communities. The conceptual framework of Swanzen and Rowe (2013) includes many elements:

community engagement, service-learning where college classes directly aim to benefit student communities, social development that is people-centered, civic service that promotes social engagement to the local community, and appreciative inquiry where knowledge aims to enhance human society.

The work of Van Den Wiljngaard et al. (2015) builds on the work of Watts, Flanagan, Evans, and Prilleltensky (2007), which presents a theoretical framework for youth civic engagement based on developmental and liberation psychology. The main goal of Watts et al. was the creation of a testable theoretical framework for researchers in the field of social and civic engagement. Their model of civic engagement included four elements. The first element is the worldview and social analysis that incorporate epistemological theory as a central part that enhances youth engagement in their societies. The second element is the sense of agency, which includes self-efficacy, political understanding, and the empowerment to play a leading role in the community. The third element is opportunity structure, which concerns individuals' needs to incorporate the available resources and shape a structure that enhances youth involvement in the community. The fourth element is social involvement, which is the product of the model, where young people actively commit to their involvement. This framework uses epistemological understanding about the world as an input element, and the output element is individual social engagement. The sense of agency and the opportunity structure perform as moderators in this equation.

In addition, Egerton (2002) followed students during their late teenage years, comparing their attitudes toward social and civic engagement with those in their early 20s. The results show that people involved in more civic and social engagement at earlier ages continue to engage more than those who engaged less in their teenage years. This raises the importance of enforcing a sense of social engagement from an early age. In addition, the research found that higher education had a limited effect on students' engagement. However, social groups had a positive effect on enhancing engagement. Students were affected by their surrounding peers, such as when students are affiliated with a group with a tendency toward social engagement.

b. Academic Engagement

The understanding of academic engagement is characterized by ambiguity. Many researchers have tried to apprehend the concept of academic engagement. Johnson and Stage (2018) examined the graduation rate at four public institutions in which the Association of American Colleges and Universities (AAC&U) high-impact ten practices (Kuh, Cruce, Shoup, Kinzie, and Gonyea, 2008) were implemented in contrast to universities which did not implement these practices. The ten high-impact educational practices are freshman seminars, core curricula, learning communities, writing courses, collaborative assignments, undergraduate research, study abroad, service-learning, internships, and capstone and senior projects (Kuh et al., 2008). Johansson and Stage

(2018) used these ten practices as proxy measures for academic engagement. Correlation analysis did not find a significant relationship between these practices and graduation rates. Regression analysis, however, found a slightly negative effect of internships on graduation in four years but no impact in six years. These findings show that internships add more time to years till graduation. Freshman seminars had a negative correlation on both types of students graduating in four years and six years. However, the study found no significant difference between the two times of graduation. Receiving loans tends to push students to graduate faster, reflected by a positive regression coefficient. The study suggests that freshmen seminars may lead students to not graduate early due to the rigorous expectations presented during these seminars. Generally, the study found that high-impact practices do not support student engagement and success. It is better to focus on student support and services rather than highly selective procedures to help students' persistence and graduation rates.

Oncu (2015) claims that academic engagement has three types: behavioral, cognitive, and emotional. Behavioral engagement includes several factors such as "active and collaborative learning, participation, attendance, student-faculty interaction, academic effort, preparation for class, and so forth" (Oncu, 2015, p. 537). The SEM analysis found that active learning and paying attention are both represented by one construct, which is academic engagement, and both of them are positively correlated to peer evaluation. Generally, peer evaluation is a predictor for academic engagement

represented by active learning and paying attention. However, students have higher scores when they evaluate each other's work when compared to instructors. This may support the relationship between both academic and social engagement.

Truta, Parv, and Topala (2018) conducted research to assess the impact of academic engagement on the rate of student dropouts. Using a sample of (N = 1063) and dedication, absorption, and vigor as the three dimensions of academic engagement, dedication was the only significant predictor for student dropouts from schools contrasting all variables that were tested. Students who have less absorption tend to drop out during the first semester. Satisfaction had a negative impact on the dropout rate, meaning that students with low satisfaction about their universities are more vulnerable to leaving school. The study found that parents' education significantly affects academic engagement. Students whose parents are less educated engage more in their schools. Students who are financed by the government engage less than those who pay tuition. Mainly, the study showed that students who have better financial support and whose parents have college degrees persist more than students who do not have such advantages in their universities.

In general, both academic and social engagement can affect students' graduation rates. Flynn (2014) found that when students engage academically and socially in their educational institutions, they tend to persist in their third year of college. The study,

however, found that students engage socially more than academically in the first year of college (Flynn, 2014; Kuh et al., 2008). Both types of engagement showed their importance in students' success in the first year of college. Comparing ethnic groups, more African-American and Hispanic groups proceeded to the third year compared with the white/Caucasian group, and African-American and Hispanic groups were more engaged both academically and socially depending on socioeconomic status and the financial aid they received (Flynn, 2014). However, social engagement among African-American and Hispanic groups was superior to academic engagement. This shows how providing support for students would help them engage more and succeed. In the fourth year, social engagement had a significant effect on receiving a bachelor's degree compared to academic engagement. Witkow, Gillen-O'Neel, and Fluigni (2012) reported lower social engagement for Latino and Asian students compared to European-Americans in colleges. Therefore, support programs for minority students tend to be essential to ensure their engagement progression.

Most importantly, GMS scholarships had a positive effect on students' academic and social engagement. Comparing students who received a scholarship with those who were not selected, scholarship recipients were more socially and academically engaged in their educational institutions (Hu, 2010, 2011; Oseguera, Denson, & Hurtado, 2008). Perhaps this is because students with scholarships do not need to work for financial purposes, and they find more time to be engaged in their college, which is one of the

goals of higher education. Hu (2011) went further than that. He found that the increased social and academic engagement helped students develop leadership skills. This work builds on Hu's (2011) work that assesses the contribution of social and academic engagement in building leadership skills and obtaining a leadership position after graduation. The current research study, in contrast, examines the role of exposure to the environment of higher education represented by engagement, challenges, and support in building soft professional skills. The study also focuses at the item level of GMS data using SEM techniques, whereas Hu's (2010; 2011) work only used EFA.

Professional Skills

One of the major indicators for higher education success is preparing students for the future through the development of professional skills. These professional skills include analytical skills, oral communication, working independently, writing clearly, and the ability to adapt to change. Some of these needed skills are included within curricula, and some are provided for students through separate training sessions (Rose, 2013).

The concept of professional skills is not cohesively defined because of the vast inclusive skills units involved in each profession. It is noticeable from the literature that each field has different opinions about professionalism. Rose (2013) differentiated between academic skills and soft skills for graduate students. She referred to academic

skills as the competency of research and teaching that universities dedicate to achieve high standards. On the other hand, she identified soft skills as skills related to "self-development, self-management, self-perception, communicating effectively," and the transformation of knowledge in an understandable way to individuals outside of academia. Weber, Crawford, Rivera, and Finley (2011) referred to soft skills as the interpersonal skills required in workplace applications. Another definition of soft skills is "skills, abilities, and traits that pertain to personality, attitude, and behavior rather than to formal or technical knowledge" (Moss & Tilly, 1996, p. 253). Del Prette and Del Prette (2001, p. 89, as cited in Pereira-Guizzo, Del Prette, & Del Prette, 2012) described soft skills as, "those that attend to the different interpersonal demands of the work environment, aiming at the achievement of goals, the preservation of the group's well-being and the respect for each individuals rights" (p. 89) There are many other definitions and descriptions of soft skills in the literature. Some of them come very close to each other, and others are distinct and very general. For the sake of this research, I will only focus on the general professional soft skills that most universities use to support their students.

Keeping the ambiguity of the concept of professional skills and, most importantly, soft skills in mind, Chamorro-Premuzic, Arteche, Bremner, Greven, and Furnham (2010) found that soft skills positively correlated to students' achievement. The researchers found that enhancing soft skills may increase college students' engagement in their

academic studies. However, students enhance their professional skills through engagement in the learning process (Keow, 2019). This debate might refer us to think that the relationship between the engagement in higher education and the development of professional skills is a reciprocal relationship.

Research noted that university graduates lack of soft professional skills (Hart Research Associates, 2015; Magogwe, Nkosana, & Ntereke, 2014; Mitchell, Skinner, & White, 2010), which are important in careers that require interaction with other people (Keow, 2019). More importantly, verbal and nonverbal communication is critical in workplaces for clear interaction among people (Hart Research Association, 2015; Andreas, 2018). The lack of these skills may cause misunderstanding and conflicts. Andreas (2018) accused higher education for this drawback because these institutions do not assure the direct social capital communication either academically or socially.

The procurement of soft professional skills is important to enhance employability (Keow, 2019). Because of that, one of the indicators of success for higher education institutions is employment rates for graduates. Keow (2019) conducted a qualitative study in the United Kingdom and Thailand to examine the relationship between joining workshops and applying soft skills in training activities in higher education institutions. The study revealed the importance of soft skills to enhance opportunities for employment. It suggests involving employers in designing university classes to enhance employability after the students complete their education. Therefore, it is crucial to marry

university programs with the needs of the job market. More importantly, it is vital to design courses that embed the needed soft skills in workplaces. Because of the struggles higher education institutions face in job placement, they must align their training sessions with increasing graduate competence.

Khasanzyanova (2017) conducted mixed-method research to study the effect of volunteering on the development of soft skills in French. First, a quantitative survey was implemented to assess what skills students acquired when engaging in volunteer behaviors. The goal of the quantitative survey was to build a thematic process when analyzing the qualitative data. After that, individual interviews were used for further understanding of how engaging in volunteer work helped in the acquisition of soft skills. The research showed that when college students engage socially with the community through volunteering, they ameliorate deficiencies in soft skills. The reason for that is that students learn these skills by doing them. The paper revealed that learning by doing is an effective way to gain such skills. The paper also presents the efficacy of adding volunteering in university curricula because it provides an effective way to enhance students' soft skills. In addition to that, it was noticeable that learning by doing is a valuable way of educating students. Therefore, university classes should increase the utilization of this method.

Challenges Faced by Low-income Students

Low-income students face problems that are specific to their population in addition to their own challenges related to higher education. They face unequal opportunities in contrast to the wealthier students (Dalton & Crosby, 2015). For example, they are less likely to obtain awards and prizes because not able to pay application fees and the lack of other requirements.

Because the lack of financial support, low-income students often work off-campus in full time jobs (Tinto, 2014). They do not have enough time to spend on campus. They attend their classes and leave. Therefore, they cannot participate in out-of-class activities which implies lack of social and academic engagement out of the classroom (Dalton & Crosby, 2015; Tinto, 2014). Low-income, high-achieving students who received a GMS scholarship were more socially engaged on campus activities in contrast with students who did not obtain a scholarship (Hu, 2010; Hu, 2011; Oseguera et al., 2009). The implication is that the secured fund they received helped them to be more engaged.

As other students in higher education, low-income students face other academic obstacles. Fook and Sidhu (2015) identified some problems students might encounter in higher education. Cognitive challenge is when students face the difficulty of understanding new concepts. Within this cognitive challenge, in addition to the struggle

with new concepts, students face a large amount of new vocabulary, a massive amount of required reading, difficulty in understanding scholarly readings, and sometimes a lack of foundation in the area of study.

Engle and Tinto (2008) supplied some suggestions to overcome the challenges that low-income students may face. One suggestion is better preparation before college by taking challenging classes and seeking information about gateway classes before completing high school. Better preparation can help students to meet college academic expectations. Moreover, because low-income students are vulnerable to financial issues, higher education institutions should widen their workshops for help completing FAFSA applications. They should educate students about financial options, including loans and grants, and they should assist students with work-study programs. Since low-income students tend to start with two-year degrees due to their economic status, higher education institutions should increase credits transferable to four-year college degrees. Some suggestions to increase credit transferability are developing plans and policies to accommodate pathway programs, and developing courses to overcome the shortcomings in previous preparation. In addition to that, higher education institutions should develop more effective orientation programs and enhance advising and mentoring programs to ease the transition to college.

Another suggestion from Engle and Tinto (2008) is to encourage engagement on campuses. It is crucial to enhance low-income students' engagement and remove issues

that may discourage it. One way to do so is by encouraging college tours to expose students to the college environment. Another way to increase engagement is to provide more work-study opportunities to increase the time they spend on campus. Classroom engagement is the most likely place for engagement (Astin, 1999). Therefore, it is important to support effective classrooms because it can reflect inside- and outside-classroom engagement (Astin, 1999; Engle & Tinto, 2008; Tinto, 2017).

Social and Academic Support

Astin (1999) and Engle and Tinto (2008) suggested removing barriers that discourage engaging in higher education. With support from academic staff and helpful people surrounding those low-income students, they can overcome these challenges. Therefore, it is vital for higher education to encourage social and academic support.

The global understanding of social support includes communication with the surrounding social units for advice, information, and appraisal support that help individuals with coping problems and understanding situations for the sake of stabilizing well-being (Cohen & Wills, 1985). Well-being is enhanced when individuals seek help from other people who share a social context with them through advice and information. This is why social support correlates to mental health. That mental health is an outcome of social support, which results in better engagement with society (Cohen & Will, 1985; Hurd, Stoddard, & Zimmerman, 2013; Watkins & Hill, 2018).

There are numerous studies concerned with the relationship between social support and student engagement. A study for Xerri, Radford, and Shacklock (2018) with business students in an Australian university found that teacher-student relationships have a significant effect on student engagement. It appears that when students have a good relationship with their instructor, they enjoy being in the class and engage more in academic activities. Moreover, the study found a significant negative relationship between teacher-student relationships and student engagement mediated by the workload in the class. It appears that when students do not have a strong relationship with instructors, they do not seek clarification from their teachers, which results in difficulty with complex and heavy course workloads. As a result, students do not engage in academic activities inside the classroom due to the lack of interest in the subject matter. Also, student-student relationships are positively related to student engagement, which means that healthy communication between peers is important to increase engagement in classrooms.

Effect of GSM Scholarship on Engagement

The Gates Millennium Scholars Program (GMS) provides scholarships to high-achieving, low-income minority students. The goal is to create future leaders in minority groups. The United Negro College Fund (UNCF) led and administered the program. Around 4,000 scholarships were given during the first year, and then 1,000 other scholarships have been added each year. The fund also encourages students, especially

graduate students, to choose majors in fields like math, science, engineering, library science, and education.

Referring to the need for support for low-income, high-achieving students, some literature discusses the GMS scholarships from different sides since the scholarships focus on a specific population. For example, DesJardins and Mccall (2014) concluded that obtaining scholarships contributed to lowering students' working hours and reduced the amount of borrowed loans. When students receive appropriate financial help, they do not need to borrow money and fall in debt. They also do not have to work for as long, which allows them to focus on their schoolwork. Students with scholarships attained higher grades in college (DesJardins & Mccall, 2014; Oseguera et al., 2009). When students have more time to spend on their education, it is reflected in higher performance. This can be an indicator of increasing students' academic engagement. In addition to better performance, GMS scholarships had a positive effect on school choices. Students who obtained a scholarship tended to go to prestigious and private universities (DesJardins & Mccall, 2014; Hu, 2010). The scholarships helped high-achieving, low-income students to increase their expectations of themselves. As a consequence, they look forward to going to higher-ranked educational institutions, which they likely could not achieve without scholarships. This would be reflected in a better future and a better lifestyle. Also, GMS scholarships had a positive effect on graduation rates and

persistence to a student's third year as well as the completion of degrees (DesJardins and McCall, 2014; Oseguera et al., 2009).

Effect of Ethnicity on Engagement

Studies find that ethnicity has varying degrees of correlation with academic engagement. A study in the United Kingdom concerning academic engagement for different ethnic minority groups with white students in distance education found little difference between ethnic groups (Richardson, 2011). The study concerned whether attainment among minority groups can be explained by the difference in academic engagement in open universities. There was no significant evidence that minority ethnic groups differ from white students in academic engagement. However, Asian and black students exhibited higher academic engagement than white students in relation to tutor usage and institutional affiliation. In addition, non-white students seemed to miss out on some items due to the lack of ability to attend tutorials consistently. However, those non-white students who did not take advantage of tutors showed lower academic engagement than white students. This shows us that ethnicity might not be a factor that strongly differentiates between students in their academic engagement.

Effects of Parents' Education

For low-income students, emotional support promotes higher student engagement in college, which results in student success (Roksa & Kinsley, 2019). Family emotional

support has a positive effect on psychological well-being and increases students' engagement. This shows how support from students' families can help them succeed. Moreover, the first generation students of this population did not benefit from family financial support compared with those who had better-educated parents (Roksa & Kinsley, 2019). Roksa and Kinsley (2019) stated that higher- educated parents value education more. Therefore, they try to help their children compared to less-educated parents, despite the lack of financial resources. Therefore, helping low-income students to get higher education will benefit the entire society to have a better sense of education.

Students sometimes need academic help. If parents cannot provide such help, students try to figure out other ways to get help. Therefore, Truta et al. (2018) found that academic engagement increases when parents are less educated. Academic engagement could be a way for students to close the academic gaps at home. Being active in academic activities is a good strategy for better education in general.

Summary

In summary, Astin's theory of involvement provides a theoretical framework that allows researchers to conduct meaningful research. The theory defines involvement as the amount of physical and psychological effort students invest in producing the intended developmental goals in higher education. This involvement is subject to change, and it should be measurable. Students' developments are associated with the amount of

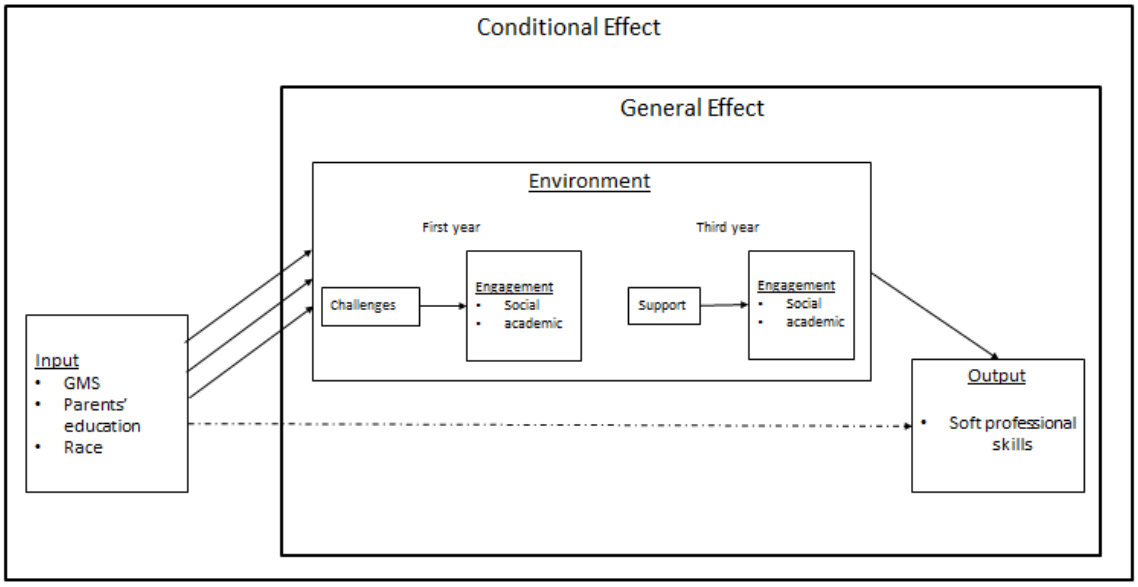
involvement. Therefore, higher education should align their policies in the way to assure a high level of involvement. The theory says that instead of studying the effect of students' background on the developmental outcome, we must consider the effect of students' involvement in their colleges' environments. The environment is a mediating factor between students' inputs (i.e., background) and their developmental outcome, input → environment → output.

The presented literature shows that challenges may affect students' social and academic engagement. However, receiving support can help students to better engage with the college environment. The literature shows that students with higher engagement in the first year of college keep a higher level of engagement in the later years. The increased level of engagement helps to develop a higher level of soft professional skills. The relationship between engagement on-campus and experiences while in college with the developmental outcome reflects the general relationship based on Mayhew et al. (2016). What students bring with them into higher education of background affects called conditional effect (Mayhew et al., 2016). In this research, the conditional effects are receiving a GMS scholarship, parents' level of education, and ethnicity.

Building on Astin's (1984) model, this study intended, in the general effect model, to provide a measurement model that assesses the relationships between challenges at the first year of college, social and academic supports that students receive, and academic and social engagement as the environment effect. The outcome of the model is the skills

developed from attending higher education. Parents' education and whether or not the student obtained a GMS scholarship in the conditional model were investigated. Ethnicity is a possible cause of variation. Therefore, it was added to the conditional effect models. However, each of the three variables were test separately as an invariance test because of the limitation of the structural equation modeling the (SEM) statistical test that is used in this study, which cannot test all of them at once. Figure 2 represents the intended general and conditional effects in this research. The dashed line represents the relationship between the students' inputs and their outcome development, which is out of consideration in Mayhew's et al. general effect model (2016).

Figure 2
Proposed theoretical model



Research Questions:

The present study addressed the following two questions:

2. General effect
    2.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?
    2.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?
    2.3. How did low-income, high-achieving students encountered challenges in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?
3. Conditional effect (factorial Invariance Analysis)
    3.1. Did the provision of a GMS scholarship or the lack of such assistance affect the proposed general effects of the development of soft professional skills for low-income, high-achieving students?
        3.1.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

3.1.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

3.1.3. How did challenges that low-income, high-achieving students encountered in the first year of college affect their soft professional skills development? Does social and academic support mediate this relationship?

3.2. Did parents' education influence the proposed general effects of the development of soft professional skills for low-income, high-achieving students?

3.2.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

3.2.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

3.2.3. How did challenges that low-income, high-achieving students encountered in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

3.3. Did race influence the proposed general effects of the development of soft professional skills for low-income, high-achieving students?

3.3.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students from different races?

3.3.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students from different races?

3.3.3. How did challenges that low-income, high-achieving students from different races encountered in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

Chapter Three: Methods

In this chapter, I present the methods I am using to test a conceptual model linking academic and social engagement and support to development of soft professional skills for high-achieving, low-income students in higher education. First, I envisioned the model according to the review of the published literature. I will assess each construct in the model using exploratory-factor analysis to assure that each item loads on the proposed construct using principal axis-factor analysis. Then, confirmatory factor analysis is utilized using structural equation modeling (SEM) procedures. After that, I will use hybrid SEM to build and to assess the significance of the model. Finally, I will run factor- invariance procedures three times. The first factor-invarinace is based on partners' education to investigate whether it will affect low-income, high-achieving students' responses to items. The second factor-invariance analysis is to assess differences based on obtaining the GMS scholarship. The third is to discover whether the structure differs based on ethnic group.

Participants

Participants in this study were students who applied for GMS scholarships in the first, second, and third cohorts, which were between 2000 and 2007. There were some requirements to receive a scholarship: (1) be of African American, First Nations/Alaska

Native, Asian American, Hispanic/Latino, or Pacific Islander background; (2) be a full-time student entering a college or university; (3) have a GPA of at least 3.3 on a 4.0 scale; (4) be eligible for Pell Grants; (5) be a leader in community service, extracurricular or other activities (Bill & Gates Millennium Scholars Program Gates Foundation, 2019). These requirements make these students typical of a subset of the high-achieving, low-income students.

The data concerns the first three cohorts of the GMS scholarship program. The program started in 1999 to provide a fund for high-achieving, low-income minority students to offer them more extensive opportunities for education. In 2000, the first year of admission, 4,000 students were admitted to the program. Since then, 1,000 new students have been admitted yearly.

All the three cohorts are combined together to increase the sample size. Those students seeking to obtain a GMS scholarship to finance their college education have been surveyed three times repeatedly during their studies in higher education. The survey was implemented every other year. The study surveyed a total of 3,534 students, 706 were male students, 1627 females, and 1201 were from unknown gender.

The data of the first cohort who entered the program in 2001 contains 1108 responses, 642 received the GMS scholarship, and 466 did not receive the award. This cohort was surveyed in 2002, 2004, and 2006. The second cohort who entered the

program in 2001 had 1031 responses, 558 recipients, and 473 non-recipients. This second cohort has surveyed in 2002, 2004, and 2006. Finally, the third cohort who entered the program in 2002 had 1395 total responses, 660 scholars, and 735 non-recipients. The third cohort was surveyed in 2003, 2005, and 2007. It is important to note that the response rate dropped at the third time of data collection; possibly since students may have graduated.

The data contained 1233 African Americans, 234 First Nations, 927 Asian and Pacific Islanders, and 1140 Hispanic Americans. Table 1 shows the detailed demographic information for the three cohorts of GMS data.

This study concerns the first three cohorts of GMS because it is the last free complete published data available. Data included both recipients and non-recipients. Non-recipients are students who applied for the GMS program and reached the confirmation/verification phase but did not obtain a scholarship for one or more reasons. Both groups were surveyed in the first year of college. Then, another two follow-ups were conducted every other year (Bill and Melinda Gates Foundation, 2019).

Table 1
Sample Size for Each Cohort

Cohort	Cohort 1	Cohort 2	Cohort 3	Total sample
Recipients	642	558	660	1860
Nonrecipients	466	473	735	1674
Male	184	327	195	706

Cohort	Cohort 1	Cohort 2	Cohort 3	Total sample
Female	458	705	465	1627
Unknown gender	466	-	735	1201
African Americans	326	364	543	1233
First Nations	54	109	71	234
Asian/Pacific Islanders	382	224	321	927
Hispanic Americans	346	334	460	1140
Total sample size	1108	1031	1395	3534

To assure that the recipients of the GMS scholarship and non-recipients have the same level of educational achievement, I used multiple imputation procedure to recover scores that are missing in the dataset, followed by a T-test for independent samples. The analysis of Levene's test for the equality for variance did not hold for most of the generated imputed datasets nor the original dataset. Therefore, the interpretation of the T-test when equal variance not assumed is the correct answer. The pooled T-test for independent samples showed a lack of significant differences between recipients of GMS scholarships and non-recipients according to their scores in both SAT ($t = .06$, $df = 5069.40$, $p = .95$) and ACT tests ($t = .04$, $df = 58.16$, $p = .97$). In general, all unimputed data and the generated imputed datasets did not find significant differences between the GMS recipients and nonrecipients.

Table 2
Independent T-test Difference for GMS Scholars and Non-scholars

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI of the Difference	
						Lower	Upper
SAT score	.059	5069.40	.95	.002	.04	-.07	.07
ACT scores	.041	58.16	.97	.002	.04	-.08	.08

Measures

The study tests a conceptual model developed according to the published literature. The conceptual model includes measures reflecting academic and social engagement, challenges in the first year of college, support students receive during college, and developed soft professional skills. Other variables that may affect the model are GMS scholarship, parents' education, and ethnicity, which are included in the conditional effect models. GMS data is a publicly released free data. It can be downloaded from ICPSR website. There is no need for an IRB approval to obtain tis data. All items were obtained from the GMS survey (Bill and Melinda Gates Foundation, 2019). Table 3 provides the response numbers for each construct and Cronbach's alpha for the set of items for the response data.

It is important to note that the data contains three waves of data collection. However, this research will only utilize the baseline and the first follow-up. The reason

for not including the second follow-up is that there is significant attrition in the number of responses. The potential reason for this dropout is the second follow-up occurs in the fifth year after graduating from high school. At that time, students likely graduated from college, and the GMS program could not follow them for this reason.

Table 3
Responses for Each Construct and Reliability

Factor	Time 1			Time 2		
	Items	N	α	Items	N	α
Academic engagement	5	3493	.75	5	3400	.78
Social engagement	6	3493	.65	6	3209	.64
School challenges	3	3493	.82			
Social challenges	2	3493	.70			
Social & academic support				5	3408	73
Professional soft skills				5	3444	.80

Engagement

Hu (2011) noted that engagement items were similar to those used in the National Survey of Student Engagement (NSSE) with some wording differences. The survey was built on the theory that students learn better when they direct their efforts to educational activities inside and outside classrooms (Kuh, 2003). As students engage both

academically and socially during college, they adopt and develop essential skills for success.

Academic Engagement. Items in the academic engagement category were five items on a six-point scale each time: "Four or more times a week," "two or three times a week," "once a week," "two or three times a month," "once a month," "less than once a month." The questions started with: "Think about this school year, how often did you …."

- "Work with students out of class."
- "Discuss ideas with students out of class."
- "Discuss ideas with faculty out of class."
- "Work harder than expected."
- "Work on creative projects."

The assessment of reliability for academic engagement measures items estimated at ($\alpha_1 = .75$, $\alpha_2 = .78$) respectively. Table 4 shows the descriptive statistics for the items at the first time and the second time of data collections.

Table 4
Descriptive Statistics for Academic Engagement Items

Items	N	Mean		Std. Deviation
		Statistic	Std. Error	
Baseline				
How often R works with other students	3493	2.63	.03	1.49
How often R discusses ideas with student	3493	2.60	.02	1.42

Items	N	Mean		Std. Deviation
		Statistic	Std. Error	
How often R discusses ideas with faculty	3493	3.79	.03	1.51
How often R works harder than expected	3493	2.48	.03	1.45
How often R works on creative projects	3493	3.93	.03	1.74
First follow-up				
Work with students out of class -1FU	3400	2.84	.03	1.63
Discuss ideas with students out of class -1FU	3400	2.76	.03	1.52
Discuss ideas with faculty out of class -1FU	3400	3.86	.03	1.59
Work harder than expected -1FU	3400	2.86	.03	1.63
Work on creative projects -1FU	3400	3.84	.03	1.89

Social Engagement. The social engagement measure contained five items at each timepoint. Each item employed a six-point response scale as well: "Four or more times a week," "two or three times a week," "once a week," "two or three times a month," "once a month," "less than once a month." The reliability was estimated at ($\alpha_1 = .62$, $\alpha_2 = .97$) respectively. Table 5 shows the descriptive statistics for the items. The items were written as: "Think about this school year, how often did you …."

- "Participate in frat/sorority event."
- "Participate in a residence hall activity."
- "Participate in event by own culture."

- "Participate in tutoring session."
- "Participate in community service."
- "Participate in religious activity."

Table 5
Descriptive Statistics for Social Engagement Items

Items	N	Mean		Std. Deviation
		Statistic	Std. Error	
Baseline				
Participate in frat/sorority event	3493	2.26	.02	1.39
Participate in residence hall activity	3493	2.92	.02	1.31
Participate in event by own culture	3493	3.23	.02	1.31
Participate in tutoring session	3493	2.85	.02	1.31
Participate in community service	3493	3.24	.02	1.25
Participate in religious activity	3493	3.05	.03	1.49
First follow-up				
Participate in frat/sorority event -1FU	3209	2.24	.03	1.47
Participate in residence hall activity -1FU	3209	2.35	.02	1.36
Participate in event by own culture -1FU	3400	3.06	.02	1.36
Participate in tutoring session -1FU	3400	2.29	.02	1.24
Participate in community service -1FU	3400	3.32	.02	1.29
Participate in religious activity -1FU	3400	2.98	.03	1.51

Soft Professional Skills

An additional variable in the model is skills development due to school. The items for this factor were collected only at time two which is in the 3rd year of college. The question asked: "How much of your undergraduate school experience helped you develop in these areas? (If you attended more than one undergraduate school, remember we are asking about the school you last enrolled.) ….."

- "School helped develop analytical skills."
- "School helped develop my working independently."
- "School helped develop my oral communication."
- "School helped develop clear writing."
- "School helped develop my ability to adapt to change."

The answers choices were on a five-pointscale: "a great deal," "somewhat," "neutral," "not much," "not at all." The Cronbach's alpha reliability estimate for the items was (α = .89). Table 6 shows the descriptive statistics for the soft professional skills.

Table 6
Descriptive Statistics for Soft Professional Skills Items

Items	N	Mean		Std. Deviation
		Statistic	Std. Error	
School help develop analytic skills -1FU	3444	1.58	.02	.90
School help develop work independently -1FU	3444	1.57	.02	.95
School help develop communicate orally -1FU	3444	1.74	.02	.90
School help develop write clearly -1FU	3444	1.71	.02	.99
School help develop adapt to change -1FU	3444	1.50	.02	.91

Challenges

Challenges items are eight items that assess the difficulties that might face students in the first year of college. The response choices on these items are on a four-point scale: "very difficult," "difficult," "not very difficult," and "not difficult." The questions ~~were~~: "When you first started college or university, how difficult did you find each of the following. . ."

- "keeping up with school work?"
- "managing time effectively?"
- "paying for college expenses?"

- "managing money effectively?"
- "getting help with academic work when needed?"
- "making new friends?"
- "having a comfortable living environment?"
- "getting to know the way around?"

Responses to challenges variables yielded a Cronbach's alpha reliability coefficient of (α = "it will be analyzed in data analysis"). Table 7 shows descriptive statistics for challenges items.

Table 7
Descriptive Statistics for Challenges Items

Items	N	Mean		Std. Deviation
		Statistic	Std. Error	
R diff 1st yr Keep up w/ school work	3493	2.72	.02	.90
R diff 1st yr Managing time	3493	2.41	.02	.94
R diff 1st yr pay college expense	3493	2.59	.02	.90
R diff 1st yr managing money	3493	2.71	.02	.92
R diff 1st yr help w/ school work	3493	3.14	.01	.79
R diff 1st yr make new friends	3493	3.24	.01	.85
R diff 1st yr comfort living envrn	3493	3.13	.02	.89
R diff 1st yr learn way around	3493	3.42	.01	.71

Academic and Social Support

At the time of the second data collection, there were ten questions on the GMS questionnaire investigating with whom students talk about their personal and academic problems. I will use these items to represent social and academic support. The answer choices for these questions were on a five-point scale of "very often," "often," "sometimes," "seldom," and "never." The personal support question was: "How often did you seek assistance from the following people when you had a personal problem?" In contrast with this is the academic support question, which was, "How often did you seek assistance from the following people when you had an academic problem?" Then, the students were asked about the frequency of seeking help from "family members," "friends," "faculty," "clergy/priest," and "other." The reliability coefficient for social support was (α = "it will be analyzed in data analysis"), and for academic support it was (α = "it will be analyzed in data analysis"). Table 8 shows the descriptive statistics for social and academic support items.

Table 8
Descriptive Statistics for Academic and Social Support Items

Items	N	Mean		Std. Deviation
		Statistic	Std. Error	
Talk personal problems w/ family member - 1FU	3408	2.22	.02	1.24
Talk personal problems w/ friends -1FU	3408	2.00	.02	1.03

Items	N	Mean		Std. Deviation
		Statistic	Std. Error	
Talk personal problems w/ faculty -1FU	3408	3.87	.02	1.09
Talk personal problems w/ clergy -1FU	3408	4.42	.02	1.10
Talk personal problems w/ other -1FU	3408	4.98	.02	1.40
Talk academic problems w/ family member -1FU	3408	3.10	.03	1.45
Talk academic problems w/ friends -1FU	3408	2.45	.02	1.20
Talk academic problems w/ faculty -1FU	3408	2.41	.02	1.17
Talk academic problems w/ clergy -1FU	3408	4.86	.01	.82
Talk academic problems w/ other -1FU	3408	5.21	.02	1.14

Parents' education

The GMS survey also asked about parents' education: "What was the highest grade or level of education that your father completed?" "What was the highest grade or level of education that your mother completed?" The choice answers were: "less than high school," "GED," "some college," "bachelor's degree," "master's degree or equivalent," "doctorate," and "don't know." Father and mother education will be added together in one variable. Then, the variable will be recoded to be "at least one parent holds a college degree or more" and "both parents do not have college degree."

Data Analysis

Exploratory Factor Analysis

Exploratory factor analysis (EFA) allowed the identification of domains from several variables or items when there was no prior theory that specified the structure underlying a set of items. The process of EFA attempted to find patterns of correlations among variables to represent an underlying factor. Then it isolated variables that correlate in order to reduce the number of factors.

The decision of the number of factors followed many criteria. In the flowing, a presentation for the most used methods for determining the number of factors. Kaiser (1960) suggested retaining factors with eigenvalues of more than one. A scree plot (Cattell, 1966) explains the variance amount shared between variables. It is a graphical method that suggests retaining the number of factors above the elbow. The parallel test (Horn, 1965) is a method to determine the number of factors. It is based on simulation where random data was generated. After reproducing the random data many times, eigenvalues of generated data are compared with eigenvalues from the actual data. Then we retain the factors with eigenvalues from the actual data that exceed those from the generated data. These are some of the most-used ways of identifying the number of factors to interpret in exploratory factor analysis.

Factorability assumption that there are some correlation among variables to identify factors is required for EFA. It is important to check the correlation matrix and assure that there are several correaltions that exceed .3 (Tabachnick & Fidell, 2007). Factor analysis is factorable when the correlation matrix obtains a coefficient of the determinant bigger than zero. Kaiser-Mayer-Olkin measure of the adequacy of sample (KMO) is big enough, bigger than .6 (Tabachnick & Fidell, 2007). Bertlett's test of sphericity assess that the correlations in the correlation matrix is zero. Berlett's test is a sensitive test, and it can be affected by a large sample size.

The goal of assessing EFA was to find the latent factors among variables. The analysis utilized Principle Axis Factor analysis. The communality estimate is based on the squared multiple correlation (R^2) for regression of the variable on all other variables. Oblique rotation was used to allow the correlation between factors. A cutoff loading of .3 was used as the minimum correlation among factors. If an item had a loading difference of .1 between factors, it was considered as cross-loading, and the item was deleted.

Structural Equation Modeling

Structural equation modeling (SEM) is a family of statistical techniques that can test the relationships among variables. It can deal with both continuous and discrete variables. Unlike EFA, SEM assesses models based on an existing theory. SEM allows

testing correlations among observed variables and their manifest latent variable using confirmatory factor analysis (CFA). Path analysis can be used to examine the directional relationships among latent variables and observed variables simultaneously.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) is one of the statistical tests in the SEM family. As its name implies, the CFA technique requires a prior theory about the relationship between items and factors. The observed variables in CFA are called indicators, and the estimates of factor loadings are interpreted as regression coefficients. This technique assumes that factors are exogenous variables, and they cause their indicators. Indicators are also endogenous variables caused by unexplained unique errors.

$$\text{factor} \rightarrow \text{observed} \leftarrow \text{error} \tag{1}$$

So, the residual errors are the unmeasured part of the variance that represent measurement errors in the model. Those unique errors to each variable are not correlated with each other or with the factors, whereas factors covary with each other. To run the analysis, the computer software requires fixing one of the factor loadings to one.

Aligning CFA with classical test theory, for which the model is:

$$T = X + E \tag{2}$$

The true score (T) is equal to an observed variable (X) plus random error (E). These random errors are uncorrelated with each other, and they have a mean of zero.

Model Identification

Because SEM is based on a prior theory, the specification of the model is crucial. There must be enough degrees of freedom to test model parameters. When the model is just-identified, there are no degrees of freedom left to test the model. The over-identified model has at least one degree of freedom left to test the parameters of the model. An under-identified model is where the number of free parameters exceeds the number of observations that yield a negative number of degrees of freedom. In this case, it is not possible to test the model (Kline, 2011, p. 124 –126).

Model Fit Indices

It is essential to assess how well the data fit the model before we proceed with any further analysis. Absolute fit indices measure "how well the proposed theory fits the data" (Hooper, Coughlan, & Mullen, 2008, p. 53). These indices include, but are not limited to, model chi-square (χ^2), root mean square error of approximation (RSMEA), goodness-of-fit-statistics (GFI), adjusted goodness-of-fit (AGFI), root-mean-square residual (RMR), and standardized root-mean-square residual (SRMR).

On the other hand, incremental fit indices are a group of indices that "compare the chi-square value to a baseline model" (Hooper et al., 2008). These model indices are also cold comparative fit indices (Miles & Shevlin, 2007) or relative fit indices (McDonald &

Ho, 2002). Some of these indices are normed-fit index (NFI), and comparative fit index (CFI).

Another group of fit indices in SEM is parsimony fit indices. With nearly saturated complex models, the estimation of parameters produces inconsistent fit indices. To overcome this issue, researchers use indices such as Parsimony Goodness-of-Fit Index (PGFI) and Parsimony Normed Fit Index (PNFI).

Because of the complexity of SEM, statisticians and methodologists do not agree on a specific rule of thumb for deciding the model fit. Many researchers have different opinions about which fit index is the best. Therefore, it is recommended to report many fit indices for a single model.

Factor Invariance

Measurement invariance is a statistical process that assesses whether the same constructs are found with a different population or across different occasions. When factor invariance does not hold, there is a possibility of different factor structures across groups. Before proceeding with any further analysis steps, factorial covariance invariance, where all parameters in the model are constrained to be equal across groups, should be tested (Bialosiewicz, Murphy, Berry, 2013; Horn & McArdle, 1992;

Şekercioğlu, 2018). Kline (2011) presents the steps for assessing invariance with structural regression models:

1- Configural invariance. It is the baseline model for factorial invariance, and it is known in the literature as pattern invariance. This model allows all parameters to vary across groups (Kline, 2011, p 288; Bialosiewicz et al., 2013). This model tells us that items measure the intended constructs. Therefore, we are only interested in measuring the model fit for this configural model.
2- Metric invariance. This stage is known as weak invariance (Bialosiewicz et al., 2013). In this model, we constrain factor loadings for items across groups. It means that constructs assessed by the items have the same meaning for all groups. If we reject the null hypothesis, we can relax some of the factor loadings (Kline, 2011).
3- Direct effect invariance. This stage gives the ability to test if the direct effects are equal across groups. To do so, we impose an equality constraint to parameter estimates of path coefficients.
4- Strict invariance. This stage involves imposing equality constraints on both direct effects and disturbances. We can constrain more parameters as we test the invariance of variance-covariance for the exogenous factors.

Analysis Procedure

The analysis consisted of half the data for the EFA analysis and the other half for the rest of the SEM models for validation purposes. Using R software codes provided by Preacher and Coffman (2006) for computing power based on RMSEA, the analysis estimated a power of ≈.99 to detect significance, which means the data had over a 99% chance for obtaining significant results.

Because the indicators were ordinal variables, where lower responses indicated less positive attitudes, a weighted least square (WLS) estimate was a better estimate because it does not assume a normal distribution (Kline, 2011). However, WLS requires a large sample size, and it is subject to technical problems (Finney & DiStefano, 2006). Since the sample size was large enough, around 1,787 for the SEM analysis part, the total score was expected to be continuous and normally distributed. In addition, because I assessed EFA models first, which was prior analysis, the use of standard maximum likelihood (ML) estimation was justifiable for the SEM parts of the analysis (Kline, 2011, pp. 181).

Before proceeding with the analysis, the three datasets of the first, second, and third cohorts were combined together in one dataset. Missingness in the data was examined to determine if there is an effect due to missing data. Procedures for dealing with missing data were implemented to reduce the effect of missing data. Ideally,

multiple imputation procedure was the most efficient procedure for dealing with missing ordinal data because it provides reliable estimation for parameters (Teman, 2012). However, Mplus software did not calculate the level of significance for chi-square fit index because there is no good way to combine the results with multiple imputation (Chen, 2018; Liu et al., 2017; B. O. Muthén, 2017; Teman, 2012). Mplus did not also provide modification indices, nor was it able to provide information to calculate the chi-square difference test. Instead, Mplus provided only means of the estimates and the standard deviation. More importantly, Shi et al. (2020) suggested to relay on the comparative fit index (CFI), and the Tucker-Lewis Index (TLI) for assessing the model fit because combining chi-square can inflate a type I error (Teman, 2012). To overcome the problem of the significance of the Chi-square fit index, full information maximum likelihood (FIML), MLR, estimation that adjusts for missing data and violation of normality was used. The lowest number of categories in this data was four ordinal categories. Jia and Wu (2019) found that MLR is a reliable estimator with variables that has few categories as three using simulated data.

First, using SPSS software (IBM Corp., Armonk NY), a series of EFAs were conducted for each construct to find the items that reflected each factor. Items with low loadings and/or cross-loadings were dropped from the analysis repeatedly until the best solutions were found. Assessing the assumptions of factor analysis (i.e., factorability) were done before proceeding with each step.

Second, multiple CFAs were tested using Mplus 7.4 statistical analysis software (Muthén & Muthén, 2010). The analysis started with single construct CFA models that were found in the EFA models. Then, general associative measurement CFA models were tested to assess their model fits separately for data in the first year of college and the third year of college. After that, a measuerement CFA model was assessed. Then, a structural regression model, the hybrid model, was assessed to test the hypothesized conceptual model. The hybrid model that was used to answer the research questions is presented in Figure 3.

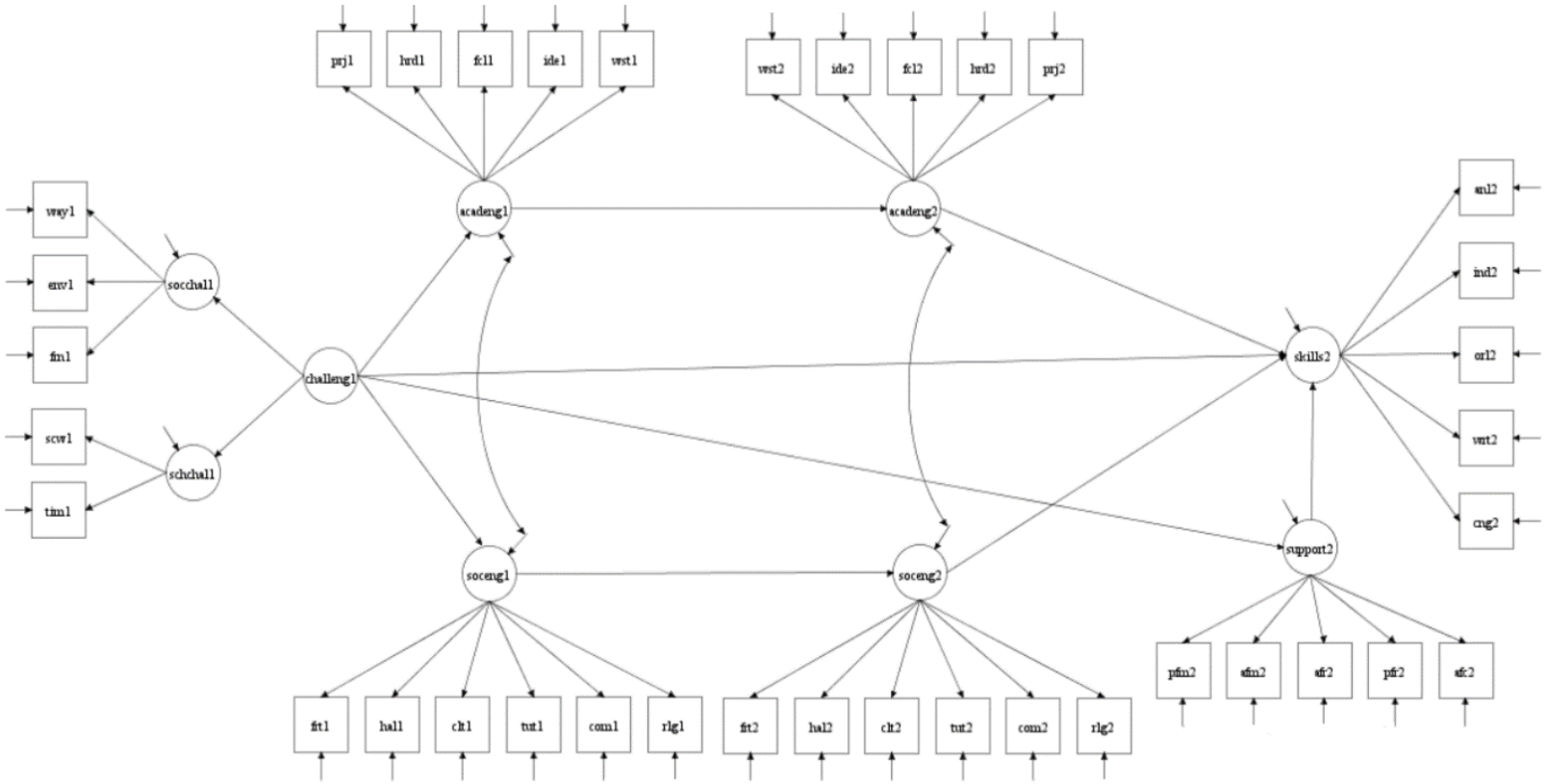
The hybrid model was specified based on the theoretical framework found in the literature. In this model, the challenges that students faced in their first year of college affected their engagement. At the second time of data collection, low-income high-achieving students sought social and academic support, which affected social and academic engagement. Finally, general professional skills were the ultimate outcome of the model as a measure of higher education success.

The proposed model considered a partially recursive model with a bow-free pattern. The disturbances of social and academic engagement latent variables are correlated since they were assumed to share some variances. However, there were no direct effects of these engagement variables on each other at the single time of data collection nor reciprocal correlation. In this case, the role of recursive model identification was applied $v(v+1)/2$ (Kline, 2011). There were seven observed variables in

the path model. The calculation of the number of paraments that can be estimated by this model was 7 (8) / 2 = 28. The model had 13 direct effects, 7 variances, and 2 covariances between the endogenous disturbance variables, which were summed to 22 estimated variables. The degree of freedom was the difference between the observations and estimated parameters, which in this case, was 6, which means that the model was over-identified.

Finally, factorial invariance analysis procedures were utilized to find whether there are differences between students who obtained a GMS scholarship and those who did not obtain a scholarship. Another invariance analysis was assessed to find if the parent's education relates to students' success. Finally, another factor invariance analysis based on students' race was done to discover if there was any race effect on low-income high-achieving students' success during their presence in higher education institutions. It is important to note that all three invariance analyses (i.e., obtaining GMS scholarship, patents' education level, and race invariance analysis) was assessed on both the measurement model and the structural regression model.

Figure 3
Conceptual Hybrid Model



Chapter 4: Results

Data Preparation

This research project was consisted of three phases. The first phase explored how variables were loaded on the intended factors using EFA. Then, individual CFA models were analyzed on different datasets to cross validate assured the previous results. In the second phase, the researcher analyzed the general effect model. This model focused on how higher education institutions' environments (i.e., challenges in the first year of college, social and academic engagement, and support) would affect low-income, high-achieving students' soft professional skills. Finally, in the third phase, the conditional effect model was used to assess if the proposed structural relationships varied by race, parents' education, and whether or not receiving the GMS scholarship.

The data was randomly divided into two halves using SPSS 22 (IBM Corp., Armonk NY). The first half of the data was used for EFA analysis, and the other half of the data was used for CFA and SEM. Each half included 1,789 of low-income, high-achieving students. Due to missing data the actuall sample sizes in each individual statistical test may differ. Given the nature of nonrandom missingness identified in the dataset, pairwise deletion instead of multiple imputation was used to handle missing data. Table 8 shows the sample size for each component in either EFA or CFA. For assumption

checking multivariate outliers and normality were assessed using Mahalanobis distance in SPSS for both parts of the data separately.

Table 9
Sample Size in Each Component

Model	EFA	CFA
Academic Engagement 1	1771	1769
Academic Engagement 2	1617	1715
Social Engagement 1	1726	1767
Social Engagement 2	1582	1715
Challenges 1	1759	1715
Social & Academic Support 2	1701	1727
Soft Professional Skills 2	1727	1727

Exploratory factor analysis (EFA)

EFA of Academic Engagement. The sample size for this analysis was 1,771 low-income, high-achieving students for the data collected in the first year of college (time 1) and 1,617 in the third year of college (time 2). The academic engagement scale's factorability assessment obtained a coefficient of a determinant of nt1 = .28 in the first year of college. However, a coefficient of nt2 = .25 was obtained in the third year of college, showing acceptable measures for factorability of the correlation matrices greater than zero (Tabachnick, 2013). The KMO measure of the adequacy of the sample was KMO = .76 in the first year of college, while it was KMO = .77 in the third year of

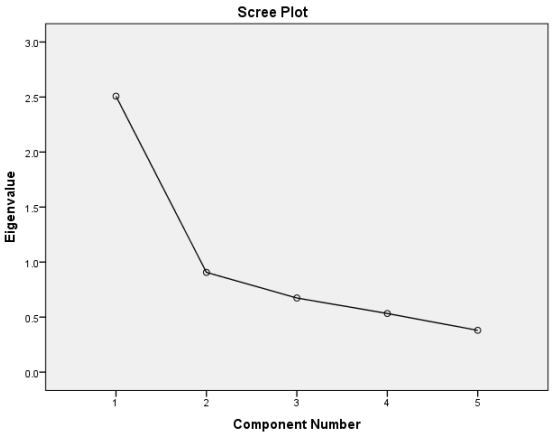
college, which was bigger than .6, indicating that the sample size was adequate for the EFA analysis. Bartlett's tests of sphericity were significant, $\chi^2 = 2202.21, df = 10, p < .001$, in the first year of college, and, $\chi^2 = 2307.91, df = 10, p < .001$, in the third year of college, which indicates the appropriateness of EFA analysis. The items at both times of data collections loaded well in only one factor, with loadings above the cutoff value of .3 for all items. Table 10 shows the loadings for each item on the academic engagement factor.

Table 10
Item Loadings for Academic Engagement Factor

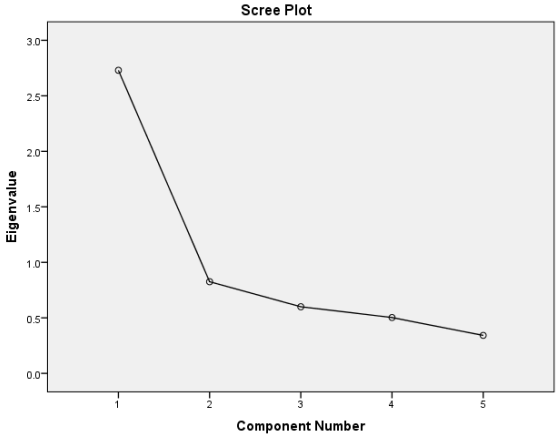
Items	Item loadings	
	Time 1	Time 2
How often works with other students out of class	.679	.663
How often discusses ideas with students out of class	.738	.770
How often discusses ideas with faculty out of class	.671	.735
How often works harder than expected	.507	.523
How often works on creative projects	.563	.535

Figure 4
Scree Plot for Academic Engagement

First year



Third year



EFA for Social Engagement. The sample size for this analysis was 1,726 for data collected in the first year of college and 1,582 for the third year of college data. The factorability assessment for the social engagement scale obtained a coefficient of a determinant of nt1 = .50 in the first year of college. However, in the third year of college, the coefficient of the determinant was nt2 = .42, which indicated that the scale's correlation matrix was factorable at the time of both data collections (Tabachnick, 2013). The KMO measure of the sample's adequacy was *KMO = .75* in the first year of college and *KMO = .78* in the third year of college, which was bigger than .6, indicating that the sample size was adequate for the EFA analysis. Bartlett's tests of sphericity were significant, $\chi^2 = 1183.78$, $df = 15$, $p < .001$, in the first year of college, and $\chi^2 = 1364.35$, $df = 15$, $p < .001$, in the third year of college, which indicated the appropriateness of EFA analysis. All six items at both times of data collection loaded well in only one factor

with loadings above the cutoff value of .3 for all items. This was confirmed by the scree plot and the parallel analysis. Table 11 shows the loadings for each item on the social engagement factor at both times of data collection.

It is arguable that "Participating in tutoring session" can fit in academic and social engagement. However, it was decided to fit this item in social engagement factors because other research used this item for measuring social engagement such as Hu (2010; 2011). Desjardins et. Al (2010) also used the item for measuring social engagement. In addition, removing the item form social engagement factor may reduce the coefficient of reliability for items measuring this factor. Given there argument, it is suggested to revise the social engagement scale items for further studies.

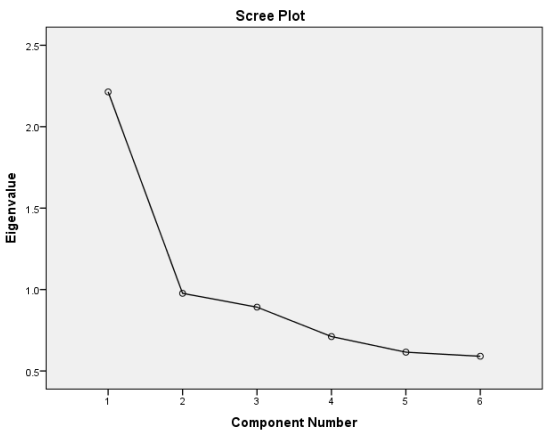
Table 11
Item Loadings for Social Engagement Factor

Items	Item loadings	
	Time 1	Time 2
Participate in frat/sorority event	.399	.488
Participate in residence hall activity	.479	.510
Participate in events by own culture	.696	.688
Participate in tutoring session	.357	.427
Participate in community service	.567	.618
Participate in religious activity	.430	.432

Figure 5
Scree Plot for Social engagement

First year

Third year



EFA for Challenges in the First Year of College. Using a sample of 1,759 low-income, high-achieving students, the assessment of the number of factors for challenge items was determined by parallel analysis (Horn, 1965). The scree plot was not evident in the initial analysis. The parallel analysis found that there were two factors in the scale. The EFA model suggested dropping the item "getting help with academic work when needed" and "paying for college expenses" because of the cross-loading problem.

The factorability assessment for the challenges in the first year of the college scale obtained a coefficient of nt = .25, indicates that the scale's correlation matrix was factorable. KMO measure of the sample's adequacy was *KMO* = *.66*, which was bigger than .6, meaning that the sample size was adequate for the EFA analysis. Bartlett's sphericity tests were significant, $\chi 2 = 2448.78, df = 15, p < .001$, which indicates the appropriateness of EFA analysis. Utilizing oblique rotation, the items loaded well in two

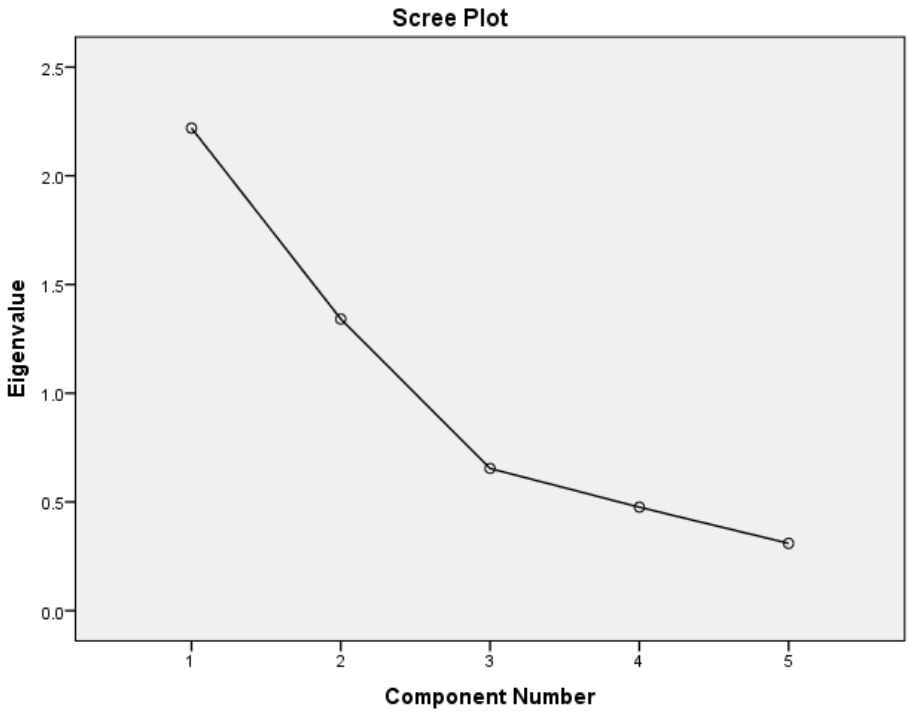
factors with loadings above the cutoff value of .3 for all items. The two factors represented the school challenges and the social challenges. This was confirmed by the scree plot and the parallel analysis. Table 12 shows the loadings for each item on the school challenges and social challenges subfactors.

The reliability study for the school challenges suggested dropping the item "managing money effectively" to increase the reliability from $\alpha = .70$ to $\alpha = 82$, leaving this factor with only two items.

Table 12
Item Loadings for School and Social Challenges

Items	Schools Challenges	Social Challenges
R diff 1st yr Managing time	.92	
R diff 1st yr Keep up w/ school work	.92	
R diff 1st yr comfort living envrn		.83
R diff 1st yr make new friends		.80
R diff 1st yr learn way around		.73

Figure 6
Scree Plot for School and Social Challenges



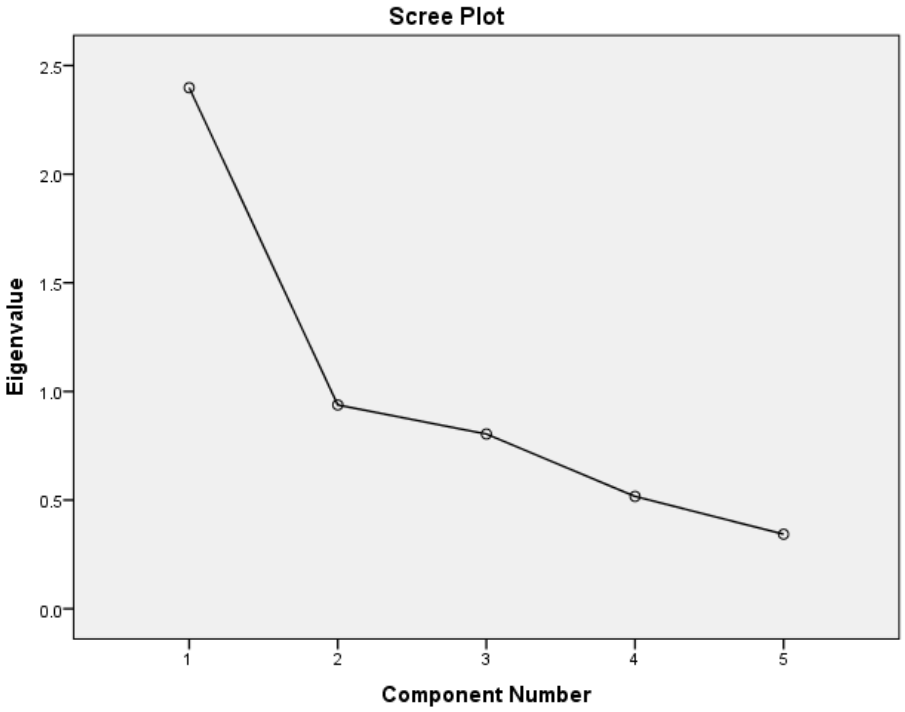
EFA for Social and Academic Support. There were 1,701 low-income, high-achieving students in this analysis. The initial EFA analysis of these items found that these items fit into three factors. This was confirmed by the scree plot and the parallel analysis. The item "talk with faculty about personal problems" was deleted because of the cross-loading into two factors. The items "talk with clergy about academic problems" and "talk with clergy about personal problems" fit into one factor, and the items "talk with others about personal problems" and "talk with others about academic problems" fit into another factor. Both of these factors were deleted because they were nonsensical. Only the items that represented the construct of social and academic support were kept.

The factorability assessment for the social and academic support scale obtained a coefficient of a determinant of nt = .33, meaning that the scale's correlation matrix was factorable. The KMO measure of the sample's adequacy was *KMO = .66*, which was bigger than .6, indicating that the sample size is adequate for the EFA analysis. Bartlett's sphericity tests were significant, $\chi^2 = 1877.73, df = 10, p < .001$, which indicated the appropriateness of EFA analysis. The final scale included five items out of the 10 tested items. Table 13 shows the loadings for each item on the social and academic support.

Table 13
Items Loadings for Social and Academic Support

Items	Item loadings
Talk personal problems w/ family member -1FU	.69
Talk academic problems w/ friends -1FU	.64
Talk academic problems w/ family member -1FU	.62
Talk personal problems w/ friends -1FU	.58
Talk academic problems w/ faculty -1FU	.44

Figure 7
Scree Plot for Social and Academic Support



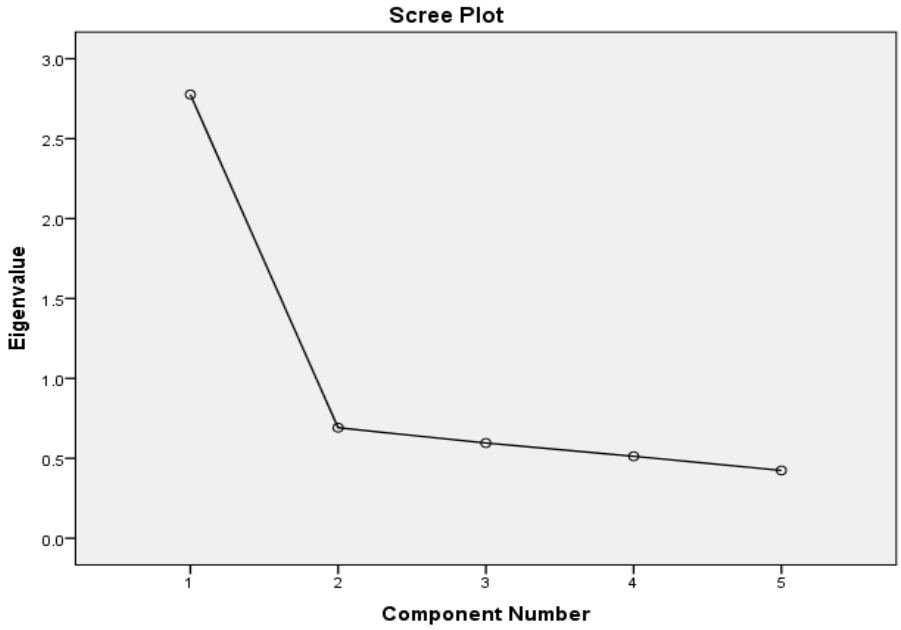
EFA for Soft Professional Skills. The total sample size used to assess the soft professional skills was 1,727 low-income, high-achieving students. All the soft professional skills items fit into only one factor with loadings above the cutoff value of .3 for all items. The factorability assessment for the scale obtained a coefficient of a determinant of nt = .06, which was bigger than zero, therefore the scale's correlation matrix was factorable. The KMO measure of the sample's adequacy was KMO = .89, which was bigger than .6, indicating that the sample size was adequate for the EFA analysis. Bartlett's sphericity tests was significant, $\chi^2 = 4716.02, df = 10, p < .001$, which assured the appropriateness of EFA analysis. Table 14 shows the loadings for each item

on the soft professional skills factor. This scale obtained an acceptable Cronbach's alpha coefficient of reliability, $\alpha = .80$.

Table 14
Loadings for Soft Professional Skills Items

Items	Item loading
School help develop write clearly -1FU	.809
School help develop analytic skills -1FU	.803
School help develop communicate orally -1FU	.801
School help develop work independently -1FU	.793
School help develop adapt to change -1FU	.776

Figure 8
Scree Plot for Soft Professional Skills



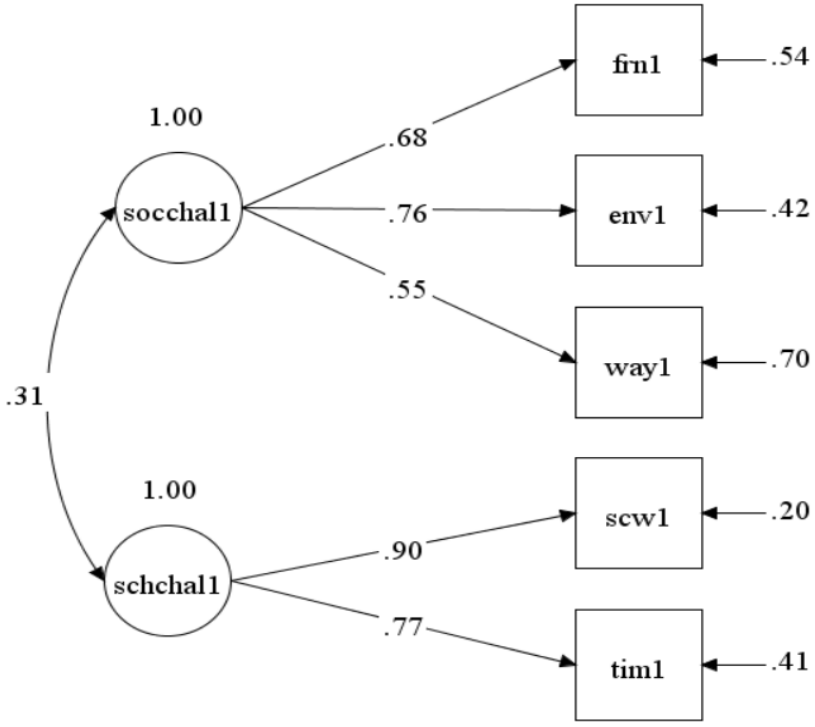
Confirmatory Factor Analysis (CFA)

There were two time points of data collection. The first data time was in the first year of college, and the second was in the third year of college. As it was noted earlier, the complete dataset was divided randomly into tow datasets. The EFA explored which items fit in each construct using the first half of the data. In this phase of the analysis, EFA results were confirmed with CFA models for each construct. Then all the CFA models were incorporated to build a general measurement CFA model. All the analyses of CFAs and SEM models, including the measurement invariance analysis, were done using the other half of the data set, including 1,787 low-income, high-achieving students. The following analysis presents each construct used to build the proposed model piece by piece.

CFA for Challenges in The First Year of College. The EFA model found that challenge variables fit into two sub-constructs: school challenges and social challenges. Accordingly, the CFA model specified school challenges with two indicators, and the social challenges factor had three indicators. For each factor, one of the factor loadings was fixed to one for identification purposes. Both school challenges and social challenges factors covary, as proposed in Figure 9. This model's analysis included 1,768 low-income, high-achieving students, and the identification of the model left 16 parameters to be estimated. This model obtained significant proof of model fit, $\chi^2 = 4.54$, $df = 4$, $p = .34$; $RMSEA = .009$ (.00, .04), $p \approx .99$, $SRMR = .01$, $CFI = 1$, $TLI \approx 1$, which indicated that the observed data fit the CFA model (Hu & Bentler, 1999). Moreover, the

standardized correlation between the social challenges factor and the school challenges factor was estimated to be positively correlated at $\beta = .31$, $p < .001$, indicating that evidence for discriminant validity is assured since it is less than the standard .5 value (Kline, 2011). On the other hand, all the items showed convergent validity evidence with standardized loading ranging between $\beta = .90$ to $\beta = 55$. All items had large effect size ranged between $R^2 = .80$, and $R^2 = .30$.

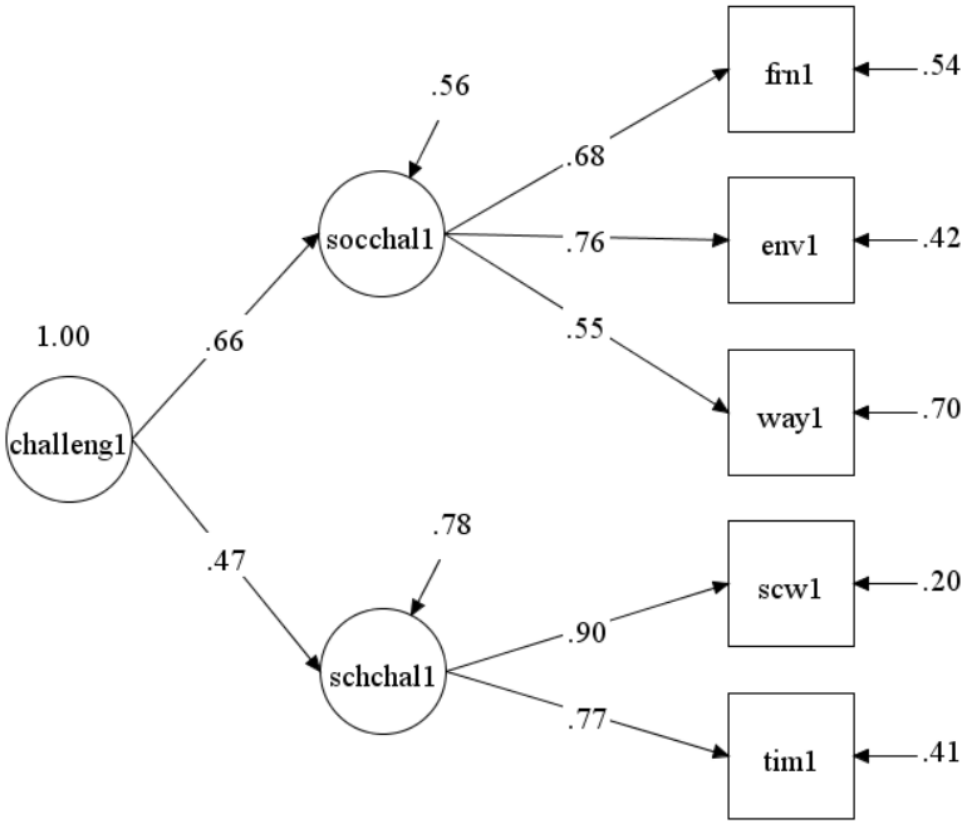
Figure 9
CFA Model for First-year Challenges.



Next, a higher-order model for the general challenges low-income, high-achieving students face at the first year of college was built according to the evidence of the

covariate model's fit. The higher-order model added a general challenges factor in the first year of college instead of the double-headed covariance between school and social challenges. Because the model had only two first-order factors, the higher-order factor loadings were fixed to one for identification purposes (Kline, 2011). The reset of specifications and identifications was the same as the covariate model. This higher-order CFA model had significant model fit indices, $\chi^2 = 4.54$, $df = 4$, $p = .34$; $RMSEA = .009$ $(.00, .04)$, $p \approx .99$, $SRMR = .01$, $CFI = 1$, $TLI \approx 1$, which support the fit of the model. Figure 10 shows the higher-order model with all estimates.

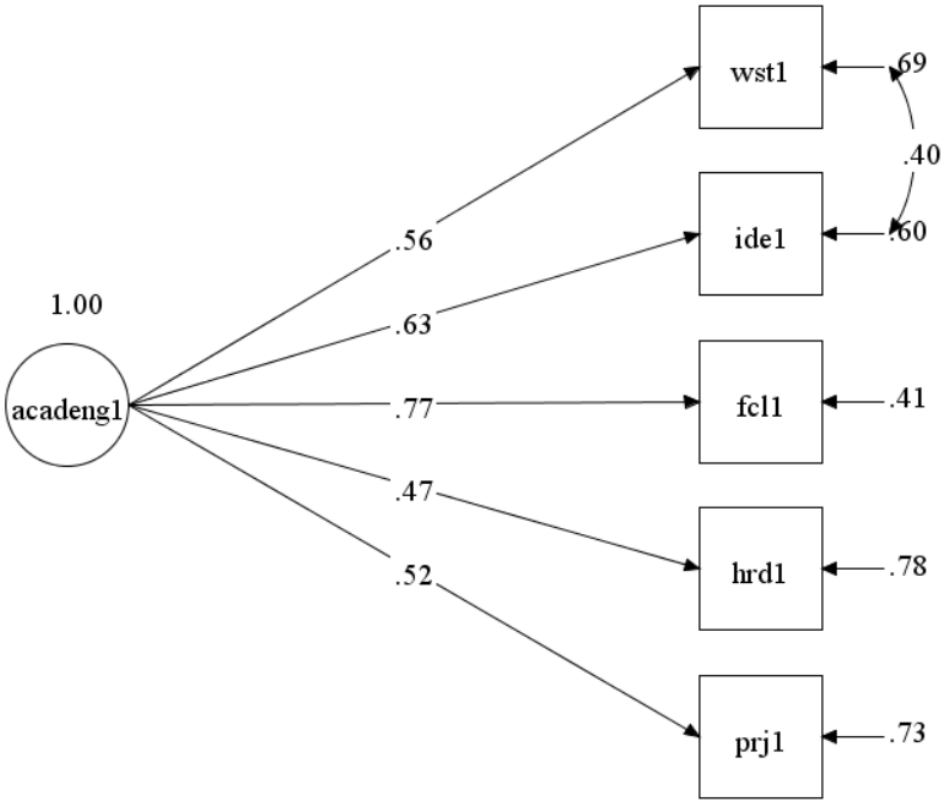
Figure 10
Higher-order CFA Model for Challenges at the First Year in College



CFA for Academic Engagement in The First Year of College. The academic engagement model had five indicators. The modification indices suggested correlating the indicators "how often work with other students" and "how often discuss ideas with students," which indicated that students shared their ideas when they worked together. The model had fit indices of $\chi^2 = 37.31$, $df = 4$, $p < .001$; $RMSEA = .07$, $SRMR = .025$, $CFI = .98$, $TLI = .95$, which supported the fit of the model. The time 1 academic

engagement model used a sample size of 1,769 low-income, high-achieving students, and it had 16 parameters free to be estimated. Figure 11 shows the graphic representation for the CFA relationships.

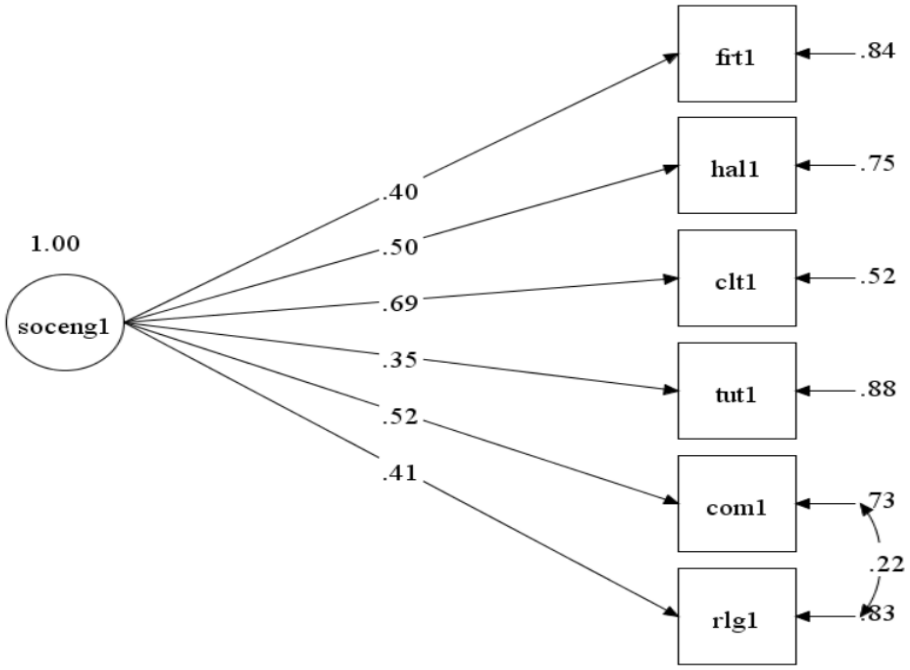
Figure 11
CFA Model for Academic Engagement



CFA for Social Engagement in The First Year of College. The social engagement factor had six indicators. The model was built and analyzed in Mplus (Muthén & Muthén, 2010) by fixing one of the indicator loadings to one and estimating the other indicator loadings. The modification indices suggested correlating the indicators

"participate in community services" and "participate in religious activities." Community services and religious activities were found to be positively correlated (Corbett, 2016; Palar, Mendel, & Derose, 2013; Yeung, 2017). After these modifications, the model had 19 free parameters to be estimated utilizing a sample size of 1,767 of students. The model had acceptable fit indices, $\chi^2 = 39.34$, $df = 8$, $p < .001$; $RMSEA = .05$, $SRMR = .02$, $CFI = .97$, $TLI = .95$, indicating the data fit the CFA model adequately despite the significant Chi-square that is sensitive to the large sample sizes. Figure 12 represents the CFA model for the social engagement factor in the first year in college.

Figure 12
CFA Model for Social Engagement

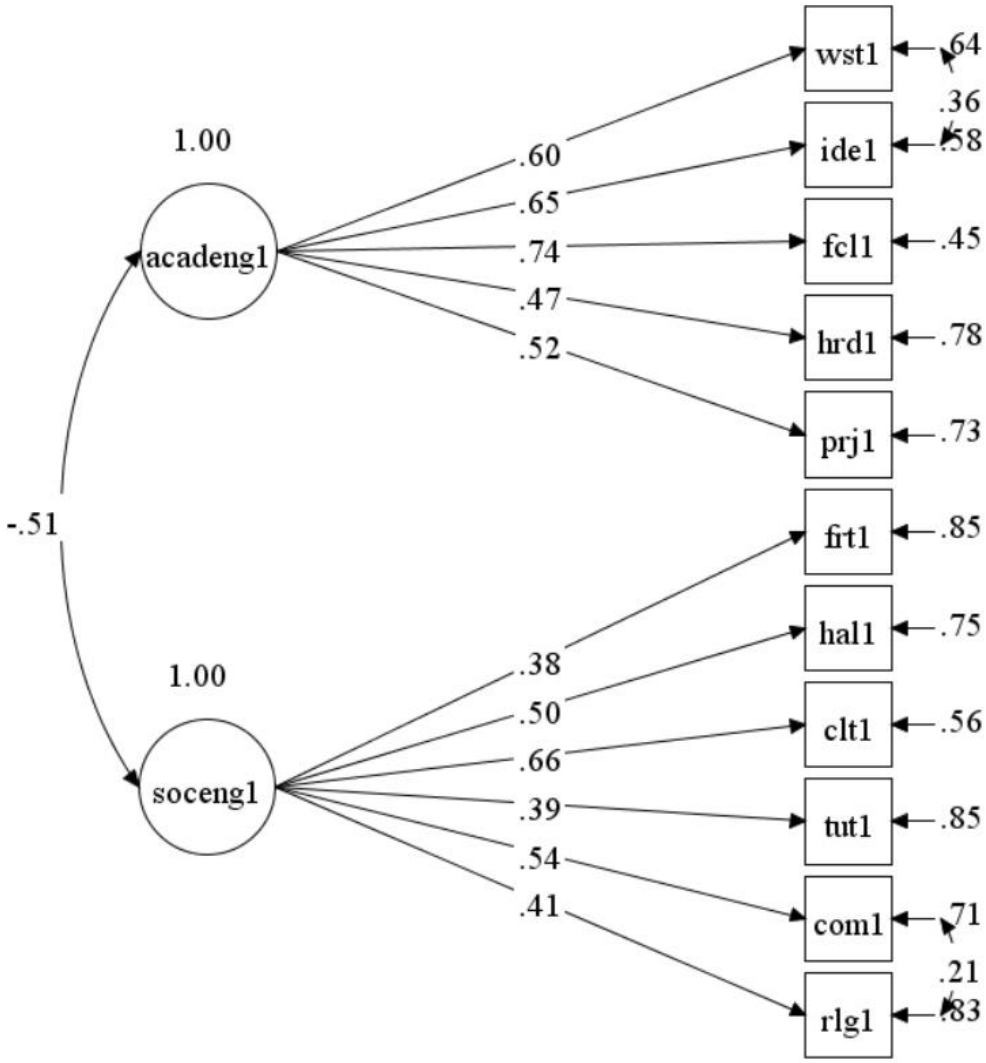


CFA for Academic and Social Engagement in The First Year of College.

After assessing the appropriateness of academic and social engagement CFA models, both models were added together in a covariance CFA model to assess the discriminant and divergent validity. There were 1,769 low-income, high-achieving students in the analysis, and the model specification left 36 parameters to be estimated. This model met the cutoff criteria of Hu and Bentler (1999) with fit indices of $\chi^2 = 276.50, df = 41, p < .001; RMSEA = .06, SRMR = .04, CFI = .93, TLI = .91$, indicating the data had acceptable evidence of CFA model fit. It was notable that the Chi-square model of fit was significant, but this can be an effect of the large sample size. The graphical representation in Figure 13 shows the covariance of the academic and social engagement CFA model.

The standardized correlation between academic engagement and social engagement was moderate, $\beta = -.51, p < .001$, which means that the discriminant validity is doubtful. Kline (2011) suggested using a standardized correlation of .50 as a cutoff limit for deciding about discriminant validity between the latent variables. The literature suggested that the two engagement factors may be connected in the further analysis as they explained the general low-income, high-achieving students' engagement. All items had effect size ranged between medium to high, $R^2 = .15$ to $R^2 = .55$.

Figure 13
Academic and Social Engagement in the First Year



Measurement Model for the Analysis Variables in The First Year of College.

After assessing the CFA models for each construct examined previously in the EFAs, a general covariance CFA model connected these constructs together. The CFA covariance model for the latent variables assessed the efficiency of the covariance of academic and

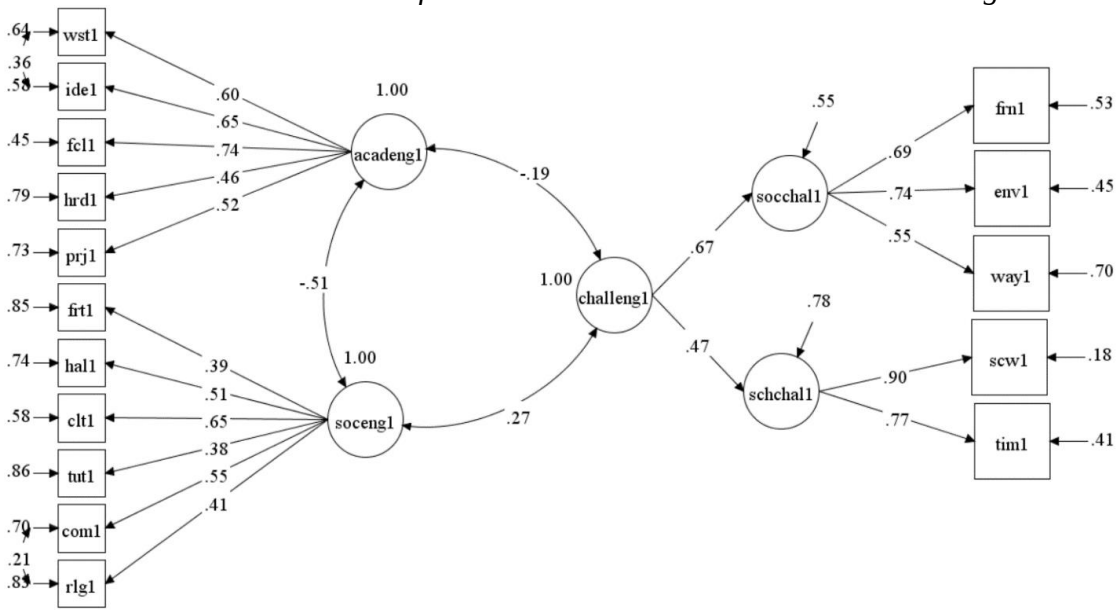
social engagement latent variables, keeping the higher-order challenges latent variable in effect. The reason for incorporating the higher-order challenges latent variable was based on the logical meaning of challenges latent variable and the evidence that indicated it was a good fit for the higher-order CFA model. The intended model is presented in Figure 14. The model had 54 parameters free to be estimated where there was a total of 16 indicators and five latent variables in the model. Using a sample size of 1,769 low-income, high-achieving students, the CFA model had an acceptable fit, $\chi^2 = 563.11$, $df = 98$, $p < .001$; $RMSEA = .05$, $SRMR = .05$, $CFI = .92$, $TLI = .90$, which supported the adequate fit of the model.

The model found a standardized correlation between the challenges latent variable and academic engagement in the first year of college of $\beta = -.19$, $S.E. = .05$, $p < .001$, which supported the discriminant validity evidence between the two latent variables. The standardized correlation between social engagement and the challenges in the first year of college was $\beta = .27$, $S.E. = .05$, $p < .001$, which supported the discriminant validity. However, the standardized correlation between academic engagement and social engagement was moderately estimated at $\beta = -.51$, $S.E. = .03$, $p < .001$, which indicated that the discriminant validity among the social and academic engagement might warrant cautious interpretation.

Table 15
Standardized Covariances for the First Year Model

Correlations	β	S.E.	p
Academic Engagement1 ↔ Challenges	-.19	.05	.00
Social engagement1 ↔ Challenges	.27	.05	.00
Academic Engagement1 ↔ Social Engage1	-.51	.03	.00

Figure 14
Associative Measurement Model for Data Collected in the First Year in College

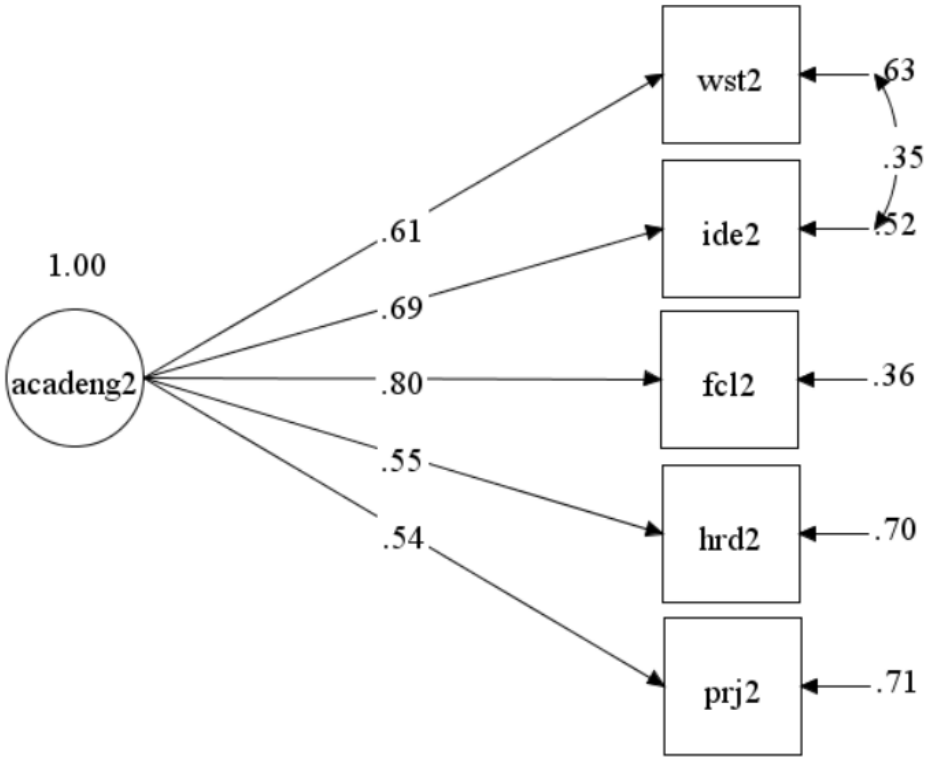


After assessing the items collected in the first year of college and building a general CFA model for them, the same process was done for the items collected in the

third year of college. Each construct was evaluated separately. Then a general CFA for all constructs was assessed.

CFA for Academic Engagement in The Third Year of College. The assessment of the academic engagement in the third year of college used 1,715 low-income, high-achieving students. The modification indices for this academic engagement construct model at the second time of data collection, similar to the model for the first year of college, suggested correlating the errors of the variable "work with students out of class" with "discuss ideas with students out of class." The model had 16 parameters free to be estimated. This model of the academic engagement in the third year of college obtained acceptable fit indices of $\chi^2 = 49.34, df = 4, p < .001; RMSEA = .08, SRMR = .03, CFI = .97, TLI = .94$. As in many cases with a large sample size, the Chi-square failed to support the model's fit. The RMSEA was at the high cutoff, .08 of the model fit (Hu & Bentler, 1999). The rest of the fit indices met the criteria for adequate model fit. Figure 15 shows the CFA model for academic engagement during the third year of college.

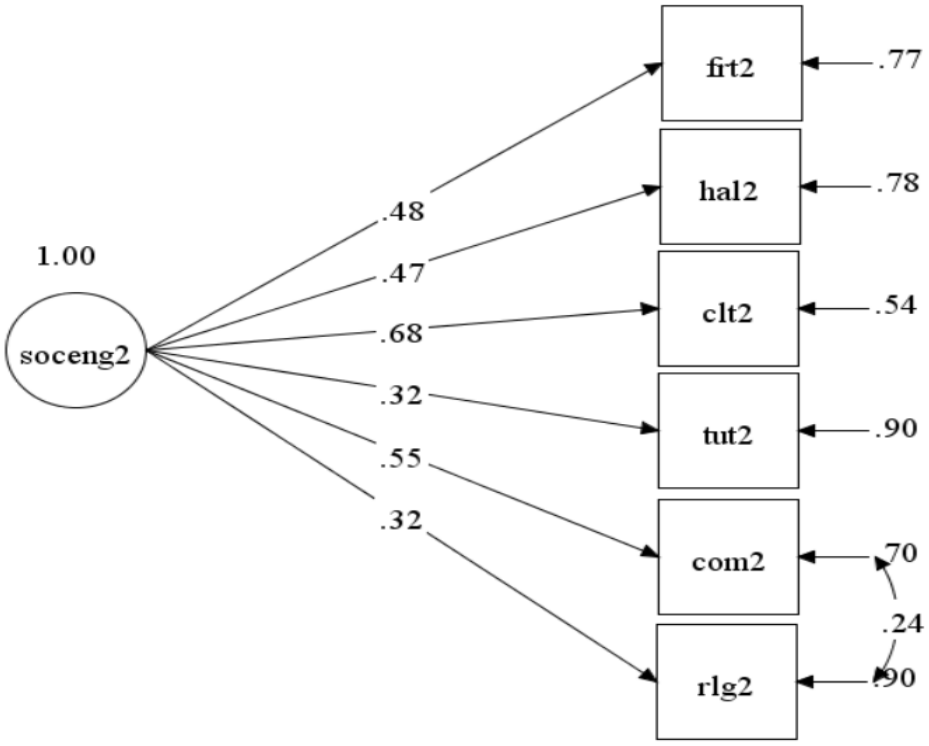
Figure 15
CFA Model for Academic Engagement in the Third Year of College



CFA for Social Engagement in The Third Year of College. The model modification indices of the CFA analysis for social engagement at the third year in college suggested correlating the indicators "participate in community services" with "participate in religious activities", similar to what was suggested for the first year of college model. The final model has six indicators. One indicators' loading was fixed to one for identification, and the errors of the two suggested indicators were covaried. The sample size for this model was 1,715 students. The model had fit indices of $\chi^2 = 18.85$, *df*

= 8, p < .015; RMSEA = .03 (.01, .05), SRMR = .02, CFI = .99, TLI = .98, which indicated the model had a good fit. RMSEA was as low as .03 with a confidence interval within the accepted range (Kline, 2011; Hu & Bentler, 1999), indicating a good fit for the model. SRMR had a value of .02, which was less than the cutoff of .08 (Hu & Bentler, 1999), supported the model fit. Figure 16 shows the CFA model for the social engagement factor during the third year low-income, high-achieving students were in college.

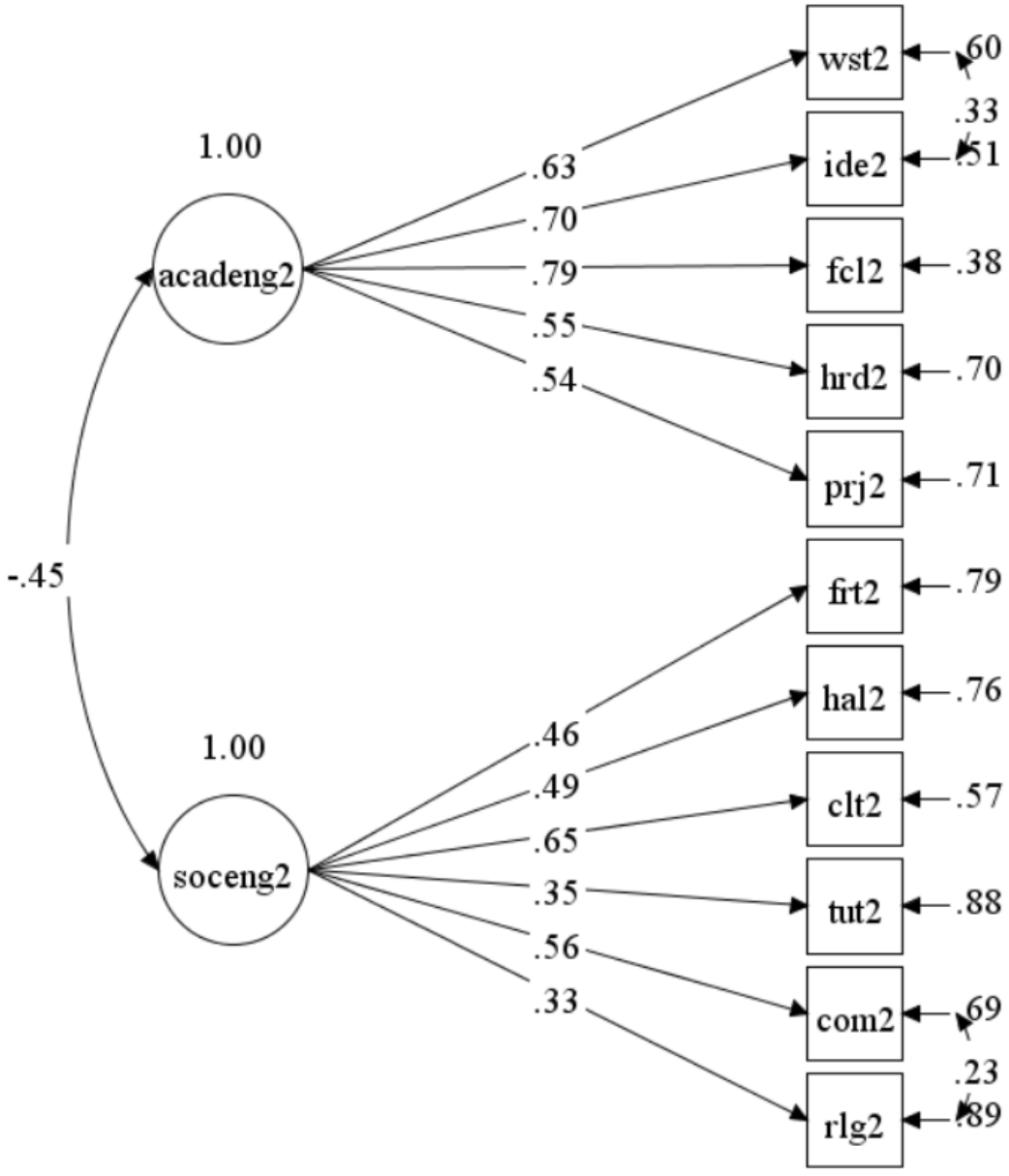
Figure 16
CFA Model for Social Engagement at the Second Time of Data Collection



Associative CFA Model for Academic and Social Engagement in The Third Year of College. Academic and social engagement in the second time of data collection were connected in an associative model to assess their discriminant validity. For each construct, one of the indicator loadings was fixed to one, and there were two indicator error variances correlated according to the previous analysis. The model obtained fit indices of $\chi^2 = 214.30, df = 41, p < .001; RMSEA = .05 (.04, .06), SRMR = .04, CFI = .95, TLI = .93$, which supported that the data fit the CFA model (Hu & Bentler, 1999). Figure 17 presents the CFA covariance model for academic and social engagement.

The standardized correlation between the academic engagement factor and the social engagement factor significantly estimated a moderately negative correlation of $\beta = -.45, S.E. = .03, p < .001$, which supported the discriminant validity of each construct with a standardized correlation coefficient blow .05 (Kline, 2011). On the other hand, the indicators of either factor showed medium to high effect sizes, $R^2 = .11$ to $R^2 = .62$.

Figure 17
CFA Model for Academic and Social Engagement at the Follow-up

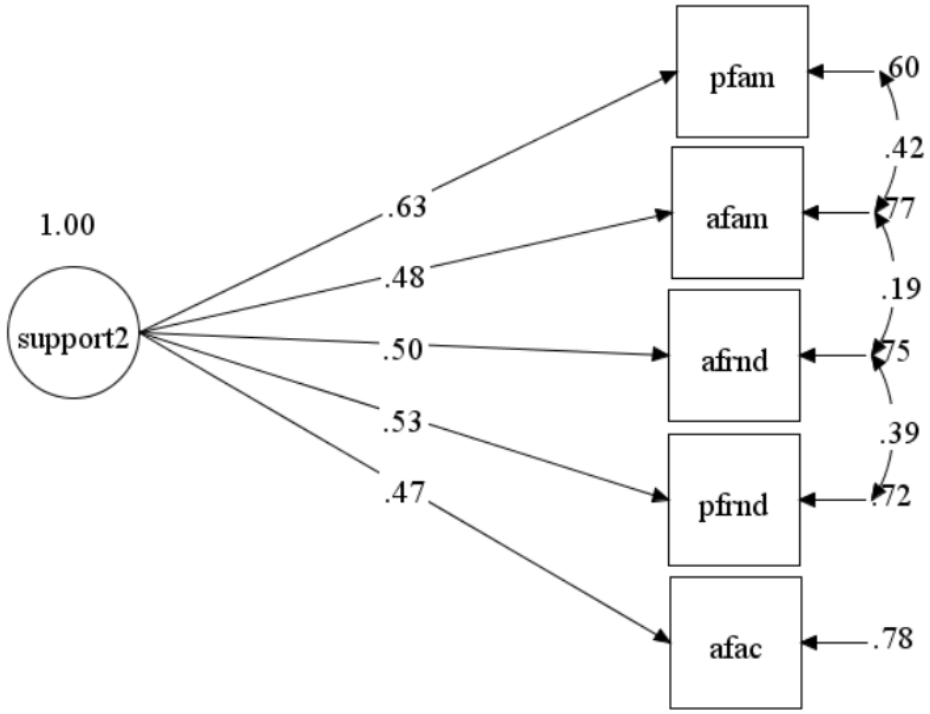


CFA for the Construct of Social and Academic Support. In the third year of college, these low-income, high-achieving students were asked about the frequency they

sought academic or social support from people surrounding them. The analysis for this model included 1,727 low-income, high-achieving students. The CFA model for support included five indicators. The nature of the relationship between peers to peers and the family of youths mixeed academic and personal topics during regular conversations. Therefore, the modification indices suggested correlating residual errors of "talk personal problem with family member" with "talk academic problems with family member" and "talk personal problem with friend" with "talk academic problems with friend." Also, there has been a body of research suggesting the influence of the peers' relationship on academic success (e.g., Brown & Larson, 2009; Harter, 1999; Mounts, 2004, 2011), which supported the suggestion of correlating "talk academic problems with family member" with "talk academic problems with friend."

After the modification, the model left 18 parameters free for estimation. The support CFA model had good fit indices of $\chi^2 = 6.32$, $df = 2$, $p = .04$; $RMSEA = .04$ $(.006, .068)$, $SRMR = .01$, $CFI \approx .99$, $TLI = .99$. Additionally, the R^2_{smc} for "talking personal problems with family member" was, $R^2_{smc} = .40$. The other indicators were low, making the convergence validity of this CFA model doubtful. Figure 18 shows a presentation of the academic and social support CFA model.

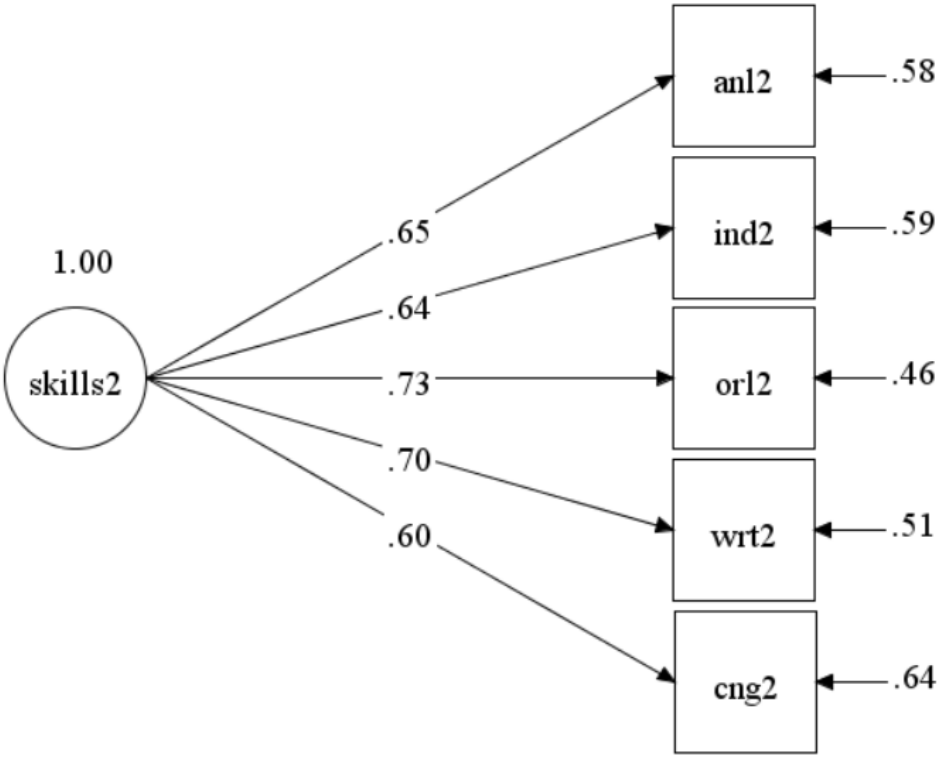
Figure 18
Academic and Social Support CFA Model



CFA for Soft Professional Skills. The last construct considered in this research was the soft professional skills low-income, high-achieving students developed by attending higher education. The soft professional skills CFA model had five indicators. The model had a total of 15 free parameters available for estimation, including five error variances, one factor variance, and four factor loadings, leaving 5 degrees of freedom to estimate the model. The sample size in this model was 1,727 low-income, high-achieving students. The CFA model obtained fit indices of $\chi^2 = 45.71$, $df = 5$, $p < .001$; *RMSEA = .07 (.05, .09), SRMR = .03, CFI = .96, TLI = .93*, which indicated a good model of fit. The R-squared for the model indicators were average to low. The highest amount of

variance explained by the variable "communicate orally" was $R^2_{smc} = .54$, followed by "write clearly" with $R^2_{smc} = .49$, which was an acceptable variance as explained by that variable. The other indicators were lower on average—around $R^2_{smc} \approx .4$, which was below average. Figure 19 shows the CFA model for the development of soft professional skills.

Figure 19
Soft Professional Skills CFA model



Covariance CFA model for the Data Collected in The Third Year of College.

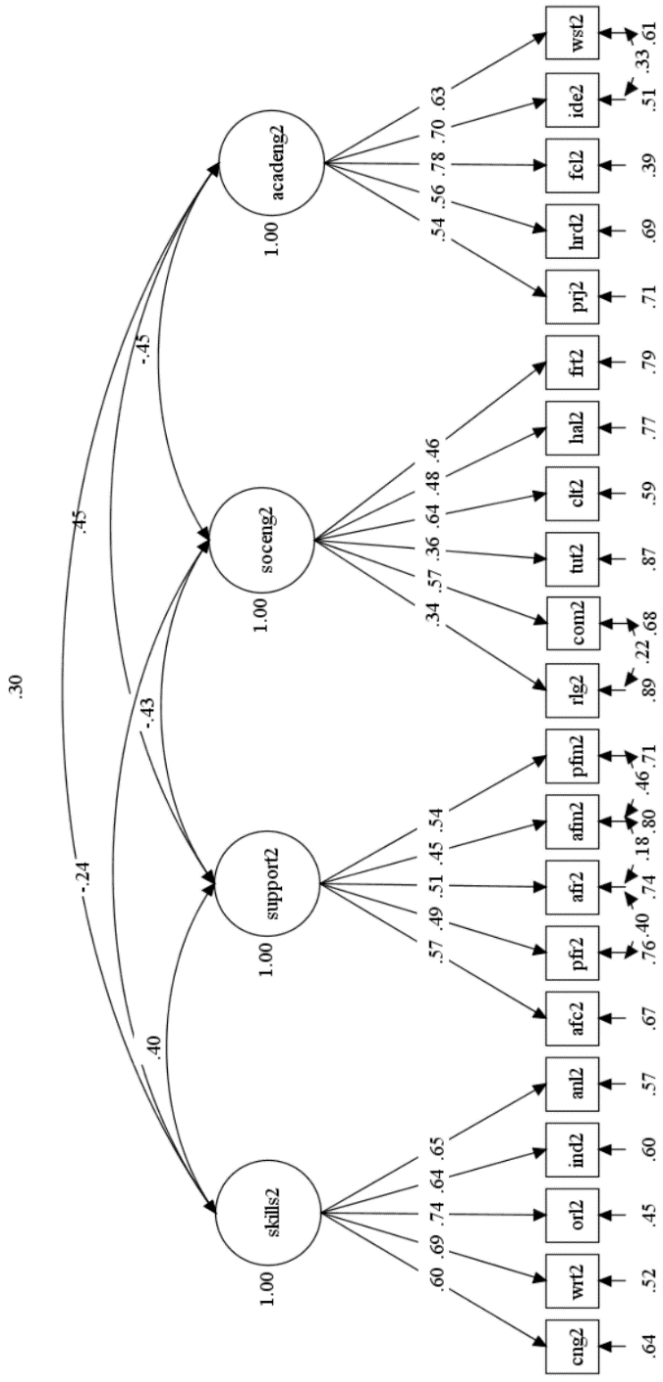
After assessing the constructs of the factors collected during the third year in college, all these intended models were put together in one CFA covariance measurement model.

The latent variables of social and academic engagement, academic and social support, and soft professional skills were covaried to keep the same constructs as assessed previously. Using a sample size of 1,752 students, this model had 74 free parameters to be estimated. The CFA covariance model obtained fit indices of $\chi^2 = 721.80$, $df = 178$, $p < .001$; $RMSEA = .04$ (.039, .045), $SRMR = .04$, $CFI = .93$, $TLI = .92$, which were considered a good fit (Hu & Bentler, 1999). This model found discriminant validity below $\beta < .5$ on the standardized estimates between all latent factors. Table 16 shows the standardized covariance estimates for the correlations between the latent variables for the first follow-up CFA model.

Table 16
Standardized Correlations between Factors at the First Follow-up

Correlations	B	S.E.	p
Academic Engagement ↔ Social Engage	-.45	.03	.00
Academic Engagement ↔ Academic and Social Support	.45	.04	.00
Academic Engagement ↔ Soft Professional Skills	.30	.03	.00
Social Engagement ↔ Academic and Social Support	-.43	.04	.00
Social Engagement ↔ Soft Professional Skills	-.24	.03	.00
Academic and Social Support ↔ Soft Professional Skills	.40	.04	.00

Figure 20
CFA Covariance Model for the Follow-up



Measurement Model. After assessing each construct, all constructs collected in the first year of college and the third year of college were put together in one measurement model. This model held the individual construct models' specifications in terms of error covariance in academic and social engagement in both data time points to assure local identification. The challenges factor was represented in a higher-order factor that included school challenges and social challenges. The total number of the latent factors was 9, including the challenges factor that reformed the higher-order described earlier. Considering the presence of the higher-order, the model had 21 covariances among the remaining seven latent factors. This model had 37 indicators connected to the same number of residual error terms. There were five correlations between errors. The model left 140 parameters free for estimation. The analysis included 1,787 low-income, high-achieving students. The fit indices for the measurement model were $\chi^2 = 4489.28$, $df = 600$, $p < .001$; $RMSEA = .06$ $(.059, .062)$, $SRMR = .05$, $CFI = .78$, $TLI = .76$, which is considered a moderate to bad fit. The model Chi-square was high with a significant lack of fit, $\chi^2 = 4664.68$, $df = 602$, $p < .001$, which might be affected by the large sample size. RMSEA indicated a good fit with a value of $RMSEA = .06$ $(.059, .062)$ and confidence interval within the accepted limit below .08 (Hu & Bentler, 1999). SRMR was less than .1 with a value of .05, which indicated the model's fit. On the other hand, CFI and TLI had lower values than the accepted values of .9 (Hu & Bentler, 1999) with values of $CFI = .78$, $TLI = .76$, which means that these indices failed to support the fit of the model.

Lai and Green (2016) presented that RMSEA and CFI's inconsistencies exist without the relationship of data or specification. Instead, it exists because these indices evaluate the model fit from different aspects. The second reason for the inconsistencies is that these indices' cutoffs are based on experts' suggestions based on simulations only, not real data. Also, there is no consensus about these cutoffs (Lai & Green, 2016; Putnick & Bornstein, 2016; Rigdon, 1996). Therefore, researchers used them incorrectly. The third reason is that there is no clear understanding of what a "good" or "bad" fit is in the existing literature. For these reasons, Lai and Green (2016) suggested retaining models with inconsistent RMSEA and CFI fit indices. Additionally, Rigdon (1996) favors the use of RMSEA over the CFI for evaluating fit indices because CFI is dependent on the baseline models.

Moreover, the standardized correlations between the latent variables are the measure of divergent validity among them. Academic engagement during the first year of college did not diverge from its latent variable for items collected at the third year of college, $\beta = .66, S.E. = .03, p < .001,$ which meant that both scales at both times carry similar meaning. The social engagement did not diverge between the first year of college and the third year of data collection with a high standardized correlation between them, $\beta = 91, S.E. = .03, p < .001$, which indicated that the latent variable of social engagement also carried the same meaning at both times of data collection. Moreover, the academic engagement latent variable was just on the border of the standardized correlation with

social engagement at the first year of college, $\beta = -.50, S.E. = .03, p < .001$, which indicated that the divergent validity between the two latent variables was doubtful. All other standardized correlations between the latent variables showed acceptable evidence of divergent validity with low correlation values. Table 17 shows the standardized correlation between the latent variables.

Figure 21
The Measurement Model

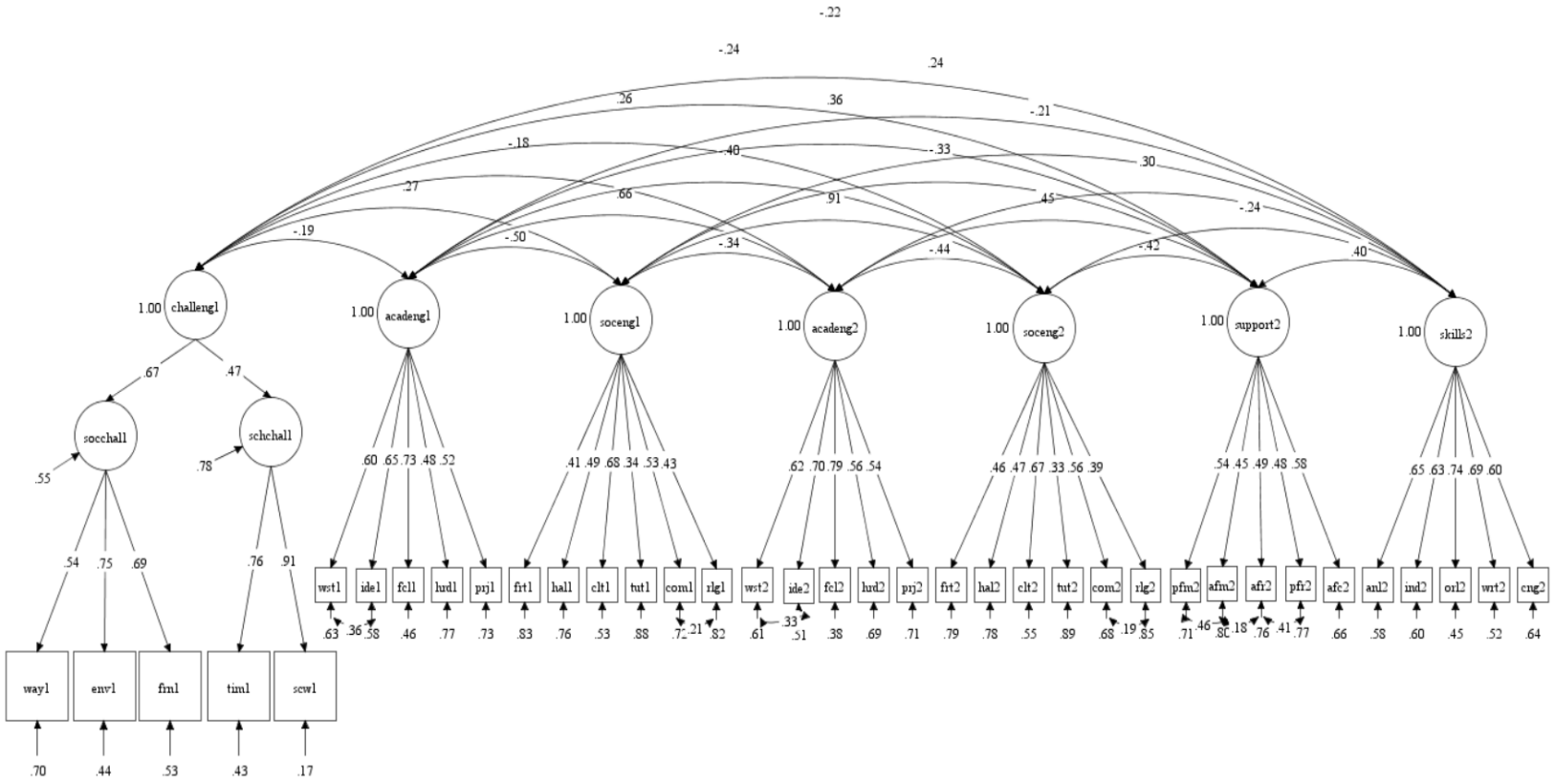


Table 17
Standardized Correlations for the Measurement Model

Correlations	β	S.E.	p
Challenges ↔ Social Engage1	.27	.05	.00
Challenges ↔ Academic Engag1	-.19	.05	.00
Challenges ↔ Social Engage2	.26	.05	.00
Challenges ↔ Academic Engag2	-.18	.05	.00
Challenges ↔ Support	-.25	.05	00
Challenges ↔ Soft Professional Skills	.22	.05	.00
Academic Engag1 ↔ Social Engage1	-.50	.03	.00
Academic Engag1 ↔ Social Engage2	-.40	.03	.00
Academic Engag1 ↔ Academic Engage2	.66	.03	.00
Academic Engage1 ↔ socio-academic support	.36	.04	.00
Academic Engage1 ↔ Soft Professional Skills	.25	.03	.00
Social Engag1 ↔ Academic Engag2	-.34	.33	.00
Social Engag1 ↔ Social Engage2	.91	.03	.00
Social Engag1 ↔ Socio-academic Support	-.33	.04	.00
Social Engag1 ↔ Soft Professional Skills	-.21	.03	.00
Academic Engag2 ↔ Social Engage2	-.44	.03	.00

Correlations	β	S.E.	p
Academic Engag2 ↷ Socio-academic Support	.45	.04	.00
Academic Engag2 ↷ Soft Professional Skills	.30	.03	.00
Social Engag2 ↷ Socio-academic Support	-.42	.04	.00
Social Engag2 ↷ Soft Professional Skills	-.24	.03	.00
Socio-academic Support ↷ Soft Professional Skills	.40	.04	.00

In summary, the individual latent variables confirmed a good model fit, and they provided evidence for convergent validity among indicators for their latent variables. The final measurement model gathered all latent variables in one model, covarying each latent variable with all other latent variables. The standardized correlations between these variables were the measure for the divergent validity. The model found convergence among the latent variables with the same meaning across times of data collection and divergent validity between all other variables.

SEM Model – General Effect

The model for general effect involved re-specification for the previous covariance CFA measurement model. This model involved a structural regression/hybrid model by

specifying to examine how the challenges that low-income, high-achieving students faced in the first year of college affected their professional soft skill development in the third year of college, and more importantly, how engagement and support they received during the time mediated this relationship.

Similarly, the social engagement latent variable in the first year of college assessed the tendency of the same measurement latent variable in the third year of college. Both academic engagement and social engagement directly affected the development of soft professional skills. Finally, social and academic support affected soft professional skills development. This model left 128 parameters free for estimation. The model is graphically represented in Figure 22.

With a sample size of 1,787 low-income, high-achieving students participating in higher education, the general effect model had fit indices of $\chi^2 = 4627.25$, $df = 610$, $p < .001$;, $RMSEA = .061\ (.059, .062)$, $SRMR = .058$, $CFI = .77$, $TLI = .75$, which, similar to the measurement model, had only a moderate model fit. In many cases, Chi-square did not support the model fit with a significant result of $\chi^2 = 4627.25$, $df = 610$, $p < .001$, a common occurrence with large sample sizes. RMSEA had an accepted fit value of .058 and a 90% confidence interval between .059 and .062, which fell within the model fit's accepted levels (Hu & Bentler, 1999). SRMR supported the fit of the model with a value of .06 that was less than the higher limit of .1 for model fit. Opposingly, CFI and TLI did not support the fit of the model with values below .9. Also, similar to the measurement

model, they did not follow the same behavior as RMSEA. As Lai and Green (2016) recommended, this model was usable. In general, the model had moderate evidence for the model's fit, which met the requirements for further results. The general effect discussion answers the sub-research questions related to the general effect model.

2.4. How did academic engagement affect the development of soft professional skills for low-income, high-achieving students?

This part of the general effect was asking about the impact of academic engagement on low-income, high-achieving students' development of soft professional skills. Because academic engagement has been measured twice, once in the first year in higher education and the other in the third year of college, the answer for this question involved calculating the indirect effect (i.e., academic engagement 1 → academic engagement 2 → skills). It was necessary to look at each direct effect first before moving to the indirect effect. First, there was a significant effect between academic engagement in the first and the third year of college, $\beta = .68$, $S.E. = .02$, $p < .001$, which meant that as the academic engagement increased by one standardized score in the measurement, the academic engagement increased by .68 standardized score in the third year of college. The positive association between academic engagement in both time points suggested the importance of encouraging low-income, high-achieving students to engage more academically as soon as they enter higher education institutions. Also, there was a positive standardized effect of the academic engagement in the third year of college and

the development of soft professional skills: $\beta = .16$, *S.E.* $= .04$, $p < .001$. A one standardized unit increase of the academic engagement in the third year of college was associated with a .16 standardized score increase in the development of soft professional skills for low-income, high-achieving students. This result validated the importance of academic engagement on the development of soft professional skills. Finally, the calculation of the indirect effect for the academic engagement in the first and third year of college and the effect of both times on the development of soft professional skills was significantly positive*:* $\beta = .11$, *S.E.* $= ..03$, $p < .001$. This indicated that a one standardized score increase of academic engagement in one or both years in college reflected a .11 standardized score increase in the development of soft professional skills. The indirect path analysis assured the importance of academic engagement during all school years on developing soft professional skills for low-income, high-achieving students.

2.5. How did social engagement affect the development of soft professional skills for low-income, high-achieving students?

Social engagement was measured twice, similar to academic engagement. Therefore, the analysis process involved indirect path analysis of the effect of social engagement in the first year of college on developing soft professional skills via social engagement in the third year of college (i.e., social engagement 1 → social engagement → skills). As presented earlier, the analysis started with the direct effects first before

calculating the indirect effect. The analysis found a highly significant positive association between both times of assessing social engagement, $\beta = .91$, $S.E. = .02$, $p < .001$, indicating that as social engagement increased by one standardized score during the first year of college, social engagement increased by .91 standardized score in the third year of college. Low-income, high-achieving students tended to increase their social engagement over the years.

Moreover, the analysis did not find a significant effect of social engagement in the third year of college on low-income, high-achieving students' soft professional skills development. This opposed the expectation of the influence of social engagement on the enhancement of soft professional skills (Khasanzyanova, 2017). The lack of significant results for the direct effect was likely reflected in the indirect effect. The indirect effect for social engagement in the first year of college through social engagement in the third year of college had insignificant results. For low-income, high-achieving students, the analysis found a lack of connectivity between social engagement and the development of soft professional skills.

2.3. How did the challenges the low-income, high-achieving students encounter in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

The answer to this general effect sub-question involved two parts. The first part investigated the effect of challenges that low-income, high-achieving students faced during the first year of college on soft professional development. This part asked about the direct effect these challenges had on the development of soft professional skills. The path analysis portion in the model did not find a significant effect for challenges in the first year of college on the development of those skills. This meant the acceptance of the null hypothesis that the challenges that low-income, high-achieving students face during the first year of college did not affect their development of soft professional skills.

The second part of the question asked about the indirect effect of challenges low-income, high-achieving students faced during the first year of college on developing soft professional skills through the accessibility of social and academic support (i.e., challenges → support → skills). There was a significant direct effect for challenges in the first year of college on social and academic support, $\beta = -.64$, $S.E. = .07$, $p < .05$, which meant that a one standardized score increase in challenges these students faced in the first year of college was associated with .64 standardized score of lowered ability to seek academic and social support. This result may point to the tendency of the low-income, high-achieving students to adopt a withdrawal behavior when they were faced with difficulties at the beginning of their higher education.

On the other hand, there was a significant positive direct effect for the accessibility of social and academic support on the development of soft professional

skills, $\beta = .22$, $S.E. = .07$, $p < .05$, which indicated that a one standardized score increase in social and academic support was associated with a .22 standardized score increase in the development of soft professional skills for those low-income, high-achieving students.

Finally, the indirect path analysis was significant, $\beta = -0.14$, $S.E = .05$, $p < .05$. The development of the soft professional skills decreased by .14 standardized score on the measurement scale as the challenges in the first year of college increased by one standardized score on the measurement scale mediated by the accessibility of social and academic support. It appeared that challenges diminished the improvement of soft professional skills due to social and academic support and caused a reduction in these skills.

Table 18
Standardized Direct and Indirect General Effect

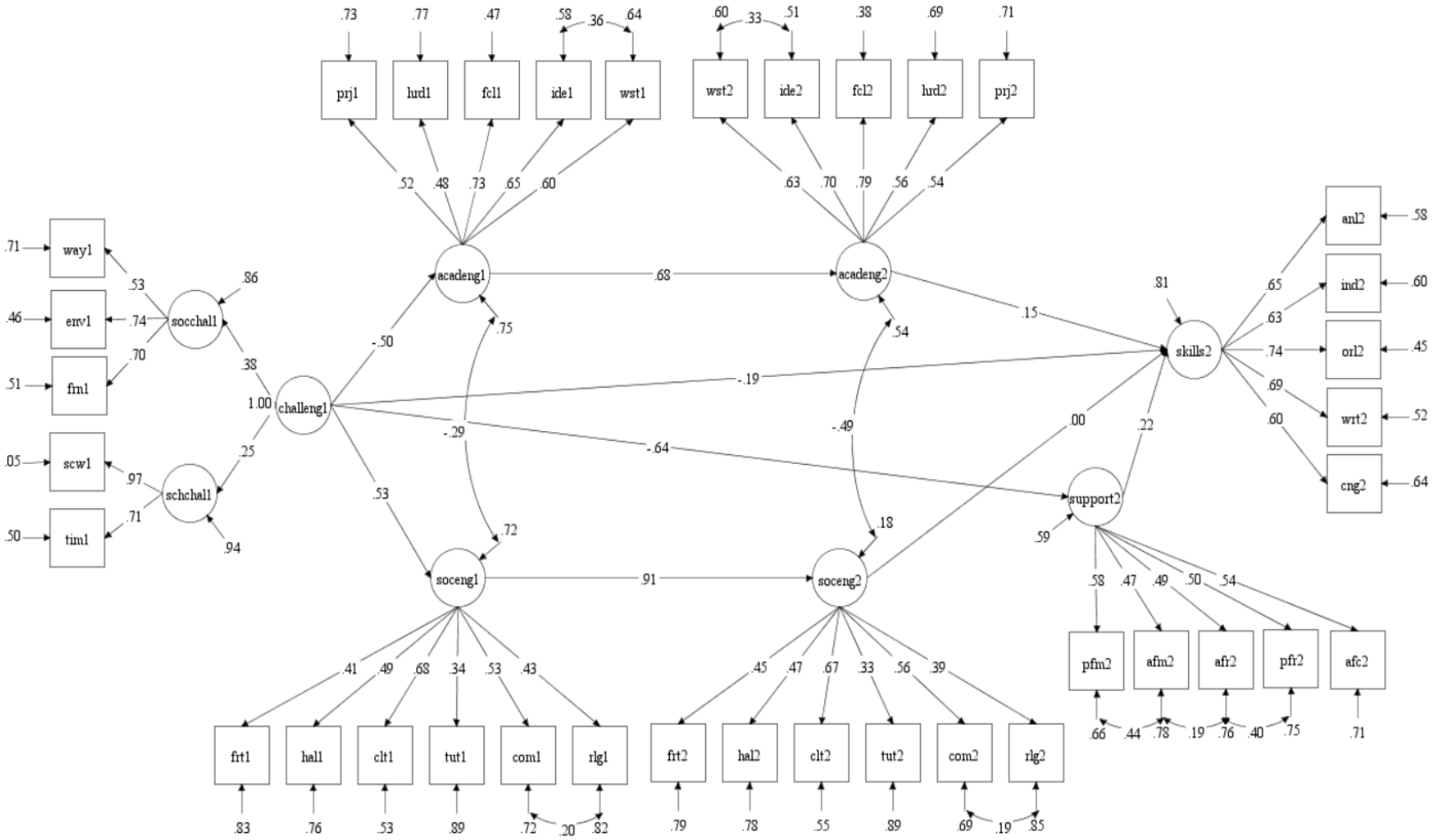
Effects	β	S.E	*p*
Direct Effects			
Academic engage1 → academic engage2	.68	.02	.00
Social engage1 → social engage2	.91	.02	.00
Social engage2 → Skills	.004	.05	.94
Academic engage2 → Skills	.16	.04	.00
Support → Skills	.22	.07	.00

Effects	β	S.E	*p*
Challenges → Skills	-.19	.11	.10
Challenges → Support	-.64	.07	.00
Indirect Effects			
Challenges → Support → Skills	-.19	.06	.00
Academic engage1→Academic engage2→Skills	.11	.03	.00
Social engage1→Social engage→Skills	.004	.05	.94

The general effect model revealed the importance of academic engagement in developing soft professional skills for low-income, high-achieving students. However, social engagement had no statistical evidence of its effect on developing soft professional skills, which opposed the expectation. It might be that this result was specific for the population of low-income, high-achieving students. Additionally, the challenges those students faced at the beginning of their higher education journey did not significantly affect their soft professional skills development. However, the support they received may have reduced the burden of developing soft professional skills.

Figure 22

The Hypothesized General Effect Model



Conditional Effect (Factorial Invariance Analysis)

The examination of conditional effects required testing the general effect's invariances based on three conditions—whether low-income, high-achieving students obtained the GMS scholarship or not; their parents' level of education; the students' racial groups. The specification of the invariance models followed the same specifications for the general effect model. The evaluation of invariance followed the calculation of $\Delta\chi^2$, the suggested calculation from Sattora and Bentler (2010). Representation results are provided for each sub-research question in the following.

The Status of Receiving the GMS scholarship or not

2.1. Did the provision of a GMS scholarship or the lack of such assistance affect the proposed general effects of the development of soft professional skills for low-income, high-achieving students?

This question asked whether or not the GMS scholarship, or the lack of such assistance, affect the proposed general effects of the development of soft professional skills for low-income, high-achieving students. The question assessed the direct and indirect relationships specified in the model across both groups. Invariance analysis for the hybrid model was used to answer that question. Before proceeding to answer the sub-questions, different invariance analysis levels were assessed to determine whether and where non-invariance existed. As shown in Table 19, the assessment of the fit indices for

the invariance models sequenced to form the single group assessment, configural, metric. However, structural invariance was not been performed because the scalar invariance was not achieved. The fit statistics for each model were achieved based on the accepted limits of RMSEA and SRMR. The Chi-square test of the exact fit, CFI, and TLI did not support the model's fits, and they behaved similarly to the measurement model and the general effect model. Therefore, this invariance analysis followed the same process of assessing the model fit by relying only on the RMSEA and SRMR fit indices. However, the Chi-square difference test with Satorra and Bentler (2010) adjustment was used to decide about invariance among models.

The models were assessed with a total sample size of 1,787 low-income, high-achieving students. There were 919 students who received the GMS scholarship and 868 who did not. The model for low-income, high-achieving students with the GMS scholarship had attainable fit indices of $\chi^2 = 2711.79, df = 610, p < .001; RMSEA = .061 (.059, .064), SRMR = .06, CFI = 77, TLI = .75$ (Lai & Green, 2016). RMSEA with a value of .063 and a confidence interval of .060, .65, supported the fit of the model. SRMR had an acceptable value of .072, which is less than one (Hu & Bentler, 1999). The model was usable; however, RMSEA and CFI did not behave the same (Lai & Green, 2016).

The same process of assessing the model fit was used with the model for low-income, high-achieving students who did not receive the GMS scholarship. The model

had an attainable fit indices of $\chi^2 = 2490.46, df = 610, p < .001; RMSEA = .060 (.057, .062), SRMR = .07, CFI = .78, TLI = .76$ (Lai & Green, 2016). RMSEA, with a value of .06 and its 90% confidence levels of .057 and .060, fell within the model fit's acceptable limits between .05 and .08 provided evidence of the model fit (Hu & Bentler, 1999). Also, SRMR supported the fit of the model with a value of .07 since it was less than one (Hu & Bentler, 1999). This confirmed that this model was attainable (Lai & Green, 2016).

The configural invariance model showed evidence of fit indices that matched the general model. This model allowed all parameters for estimation across the assessed groups of the GMS recipients and nonrecipients. The configural model based on the obtainment of the GMS scholarship had attainable evidence of the fit indices of $\chi^2 = 5201.59, df = 1220, p < .001; RMSEA = .060 (.059, .062), SRMR = .06, CFI = .77, TLI = .75$ (Lai & Green, 2016). RMSEA value and its confidence levels and SRMR supported the model fit, holding the other fit indices' delinquency in mind. An attainable fitted configural model was a condition to proceed with more constraint models.

The metric model was the model with equality constraints of indicator loadings across groups. The fit indices for the metric model were $\chi^2 = 5229.75, df = 1249, p < .001; RMSEA = .060 (.058, .061), SRMR = .06, CFI = .77, TLI = .75$, which supported the model fit based on RMSEA and SRMR. This model was interpretable (Lai & Green, 2016). The calculation of the Chi-square difference test with Satorra and Bentler (2010)

adjustment supported the metric invariance model, $\Delta\chi^2 = 28.16, df = 29, p = .14$, that items loaded similarly on the factors in the model for the group of students who have the GMS scholarship and for those who did not have it. The attainment of the metric invariance suggested testing the scalar invariance.

The test for scalar invariance required constraint indicator intercepts in addition to the loadings. This scalar invariance followed the other previously tested model fits of $\chi^2 = 5337.84, df = 1279, p < .001$; *RMSEA = .060 (.058, .061), SRMR = .06, CFI = .77, TLI = .76*. This indicated that the model was attainable (Lai & Green, 2016). The test for scalar invariance using the Chi-square difference test with Satorra and Bentler (2010) adjustment was significant, $\Delta\chi^2 = 108.04, df = 30, p < .001$, which indicated that cultural differences influenced responses for one group over the other. The significant Chi-square difference test rejected the scalar invariance. Therefore, only the metric invariance was interpretable. The remaining sub-questions compare and contrast these relationships found in the metric model. Standardized estimates were used to ease the understanding of compassion among groups.

Table 19
Fit Indices for Invariance Model Based on GMS Scholarship

Model	χ^2	df	p	$\Delta\chi^2$	Δdf	Δp	RMSEA	SRMR	CFI	TLI
GMS group	2711.79	610	.00	-	-	-	.06	.06	.77	.75

Model	χ^2	df	p	$\Delta\chi^2$	Δdf	Δp	RMSEA	SRMR	CFI	TLI
Non-GMS group	2490.46	610	.00	-	-	-	.06	.07	.78	.76
Configural	5201.59	1220	.00	-	-	-	.06	.06	.77	.75
Metric	5229.75	1249	.00	28.16	29	.14	.06	.06	.77	.76
Scalar	5337.84	1279	.00	108.09	30	.00	.06	.06	.77	.76

2.1.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

The direct effects of the two measurements of academic engagements were significantly positive for both groups. The association between the two occasions of academic engagement for the low-income, high-achieving students who obtained the GMS scholarship was significant, $\beta = .70$, $S.E. = .03$, $p < .001$, which indicated that students who received the scholarship increased their academic engagement by an average of .70 standardized score in the third year of college as compared to the first year of college. Similarly, a positive association existed between the two times of measuring academic engagement for students without the GMS scholarship, $\beta = .65$, $S.E = .04$, $p < .001$, indicated that a one standardized score increase in the academic engagement in the first year of college developed an average of .65 standadr deviation increase in the third

year of college when low-income, high-achieving students did not receive the GMS scholarship.

The direct relationship between measuring academic engagement in the third year of college and soft professional skills development had significant positive results for both groups. For students with scholarships, the academic engagement in the third year of college had no significant impact in developing soft professional skills, $\beta = .10$, $S.E. = .06$, $p = .11$. Correspondingly, low-income, high-achieving students without the GMS scholarship showed a significant impact of academic engagement on the development of soft professional skills in the third year of college, $\beta = .20$, $S.E. = .06$, $p < .05$. This indicated that those students who did not receive the GMS scholarship developed .20 standardized score better soft professional skills as they increased their academic engagement by one standardized score in their third year of college.

Finally, the indirect effects showed the total impact of academic engagement in the first year of college and the third year of college on developing soft professional skills for both groups (academic engagement 1 → academic engagement 2 → soft professional skills). The total effect of both times of measuring academic engagement lacked significant association on developing soft professional skills for low-income, high-achieving students who obtained the GMS scholarship. Contrastingly, low-income, high-achieving students who did not receive the GMS scholarship had significant results of the indirect effect of academic engagement in the first year of college on developing soft

professional skills through academic engagement in the third year of college, $\beta_{ind} = .13$, $S.E. = .04$, $p < .05$. This indicated that students who did not receive the GMS scholarship increased their soft professional skills by a .13 standardized score on the scale units by increasing academic engagement one standardized score in the first year of college moderated by their continuing academic engagement in the third year of college. In general, only the group of low-income, high-achieving students who did not receive the GMS scholarship had a significant increase in their soft professional skills development.

2.1.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

This question also required assessing the relationships among social engagement in the first year of college, the third year of college, and soft professional skills development. The direct effect of social engagement in the first year of college and the third year of college (social engagement 1 → social engagement 2) was significantly positive for students with the GMS scholarship, $\beta = .89$, $S.E. = .04$, $p < .05$. As low-income, high-achieving students with the GMS scholarship socially engage by one standardized score in the first year of college, their social engagement increased .89 standardized score in the third year of college. In addition, low-income, high-achieving students who did not receive the GMS scholarship also significantly improved their social engagement, $\beta = .92$, $S.E. = .03$, $p < .05$. That is to say, those students who did not have

the GMS scholarship increased their social engagement by one standardized score in the first year of college, their social engagement increased by .92 standardized score in the third year of college. For both low-income, high-achieving students who received the GSM scholarship and those who did not, social engagement increased over the school years. Receiving the GMS scholarship tended not to be a factor affecting those students' social engagement.

Moreover, there were no significant relationships between social engagement in the third year of college and the development of soft professional skills for both groups of low-income, high-achieving students who received the GMS scholarship and those who did not. These resultsmatched the results from the general effect model.

Since one of the direct effects was not significant, the indirect effects were likely to be insignificant. Therefore, calculating the indirect effect of social engagement in the first year of college on the development of soft professional skills moderated by social engagement in the third year of college for both low-income, high-achieving students who received the GMS scholarship and those who did not was insignificant. The insignificant relationship of the total effect for the two times of measuring engagement on soft professional skills development might have multiple explanations.

2.1.3. How did the challenges that low-income, high-achieving students encountered in the first year of college affect their soft professional skills

development? Does social and academic support mediate this relationship?

The last part of the conditional effect of the obtainment or non-obtainment of the GMS scholarship assessed the effect of challenges low-income, high-achieving students faced in the first year of college on developing soft professional skills and whether the accessible support mediated these relationships. First, the direct effect of the challenges in the first year of college on the development of the soft professional skills (challenges → skills) was insignificant for both groups, those low-income, high-achieving students who received the GMS scholarship and those who did not.

Second, the indirect effect of challenges that these students faced during the first year of college on their soft professional skills development moderated by the support accessible to them implied testing each direct effect first before proceeding to the indirect effect. The direct effect of challenges in the first year of college on the academic and social support (challenges → support) for low-income, high-achieving students who received the GMS scholarship was negatively significant, $\beta = -.53$, $S.E. = .12$, $p < .05$, which meant that one standardized score of increase in the measure of challenges that those students with scholarships encountered in the first year of college was associated with .53 standardized score lower of accessible social and academic support. It appears these students lost their desire to share their problems with others as they faced more difficulties. Moreover, challenges also significantly affected the social and academic

support for low-income, high-achieving students without the GMS scholarship, $\beta = -.71$, $S.E. = .09$, $p < .05$. As the group of students who did not receive the GMS scholarship face one more standardized score of challenges in the first year of college, they sought less academic and social support by an average of .71 standardized score.

Additionally, the accessibility of social and academic support had a positive impact on developing soft professional skills (support → skills) for low-income, high-achieving students who obtained the GMS scholarship, $\beta = .26$, $S.E. = .08$, $p < .05$. As those students with the GMS scholarship looked for social and academic support equivalent to one more standardized score of measurement, they increased their development of soft professional skills by .26 standardized score. However, there was no significant effect of social and academic support on developing soft professional skills for students who did not have the GMS scholarship.

Finally, the total indirect effect of challenges that low-income, high-achieving students who received the GMS scholarship encountered during the first year of college on their development of soft professional skills mediated by the social and academic support (challenges → support → skills) was significantly negative, $\beta_{ind} = -.14$, $S.E. = .04$, $p < .05$. One standardized score of increased challenges in the first year of college reduced the development of soft professional skills by .14 standardized score even if students had access to social and academic support. On the other hand, there was no significant indirect effect on the challenges encountered in the first year of college on

developing soft professional skills through the accessible social and academic support for students who did not receive the GMS scholarship.

In summary, the measurement invariance detected the scalar non-invariance between the two groups of low-income, high-achieving students: those who received the GMS scholarship and those who did not. Only the group of low-income, high-achieving students who did not receive the GMS scholarship experienced a significant effect of academic engagement on soft professional skills development. Challenges in the first year of college reduced the desire to seek social and academic support in both groups. Low-income, high-achieving students with the GMS scholarship benefitted from academic and social support, unlike those with no scholarship. However, when treating support as a mediator, the first year of college challenges flipped the positive effect of support on developing soft professional skills for students who have the GMS scholarship. This highlighted the importance of reducing obstacles that negatively impact low-income, high-achieving students' development of soft professional skills.

Table 20
Direct and Indirect Effects for GMS Scholarship Conditional Model

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Direct Effects						
Academic engage1 → Academic engage2	.79	.06	.00	.71	.06	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Social engage1 → Social engage2	1.07	.07	.00	1.05	.07	.00
Social engage2 → Skills	.02	.05	.73	-.01	.06	.85
Academic engage2 → Skills	.05	.03	.11	.10	.03	.00
Support → Skills	.16	.05	.00	.14	.10	.15
Challenges → Skills	-.36	.29	.22	-25	.45	.61
Challenges → Support	-1.43	.71	.04	-2.42	.83	.00
Indirect Effects						
Challenges → Support → Skills	-.32	.11	.00	-.15	.10	.15
Academic engage1→Academic engage2→Skills	.07	.04	.11	.13	.04	.00
Social engage1→Social engage→Skills	.02	.06	.73	-.02	.08	.85

Effects of Parents' Education

2.2.Did parents' education influence the proposed general effects of the development of soft professional skills for low-income, high-achieving students?

The second question of the conditional effect was whether the education level of the parents of low-income, high-achieving students affected these students' development of soft professional skills. As in the previous question, the answer required testing the

model's invariance based on parents' education level. The data was coded to distinguish between parents who held at least one bachelor's degree between them and parents of whom neither had a bacholor's degree.

First, the fit of each group was assessed separately. The model for the low-income, high-achieving students whose parents were less educated had fit indices of $\chi^2 = 2821.89, df = 610, p < .001; RMSEA = .058 (.056, .060), SRMR = .058, CFI = .79, TLI = .77$. Therefore, the model had an attainable fit (Lai & Green, 2016). The mode for parents who held at least one bachelor's degree between them was also attainable: $\chi^2 = 2327.87, df = 610, p < .001, RMSEA = .064 (.061, .066), SRMR = .06, CFI = .75, TLI = .73$. Since the models for each group was attainable, further invariance analysis were tested.

Putting both groups in one model, the configural model where all parameters were free to be estimated had attainable fit indices of $\chi^2 = 5177.69, df = 1220, p < .001; RMSEA = .060 (.059, .062), SRMR = .06, CFI = .78, TLI = .76$, which means that this model was usable (Lai & Green, 2016). The metric model with constraining loadings to be equal across groups was also attainable, $\chi^2 = 5207.07, df = 1249, p < .001, RMSEA = .060 (.058, .061), SRMR = .06, CFI = .78, TLI = .76$, thus the model was interpretable (Lai & Green, 2016). An assessment of the Chi-square difference test with Sattora and Bentler (2010) adjustment was attainable, $\Delta\chi^2 = 29.38, \Delta df = 29, \Delta p = .11$, as variables loaded on their assigned factors equally across both groups—educated parents and less

educated parents' groups. Since the metric model was attainable, scalar invariance was tested.

The scalar invariance is the model that constrains indicators intercepts in addition to loadings across groups. The scalar model had an attainable fit as well, $\chi^2 = 5343.97, df = 1279, p < .001, RMSEA = .060 (.058, .061), SRMR = .06, CFI = .77, TLI = .76$, which made this model interpretable (Lai & Green, 2016). Chi-square test with Sattora and Bentler (2010) adjustment was significant, $\Delta\chi^2 = 149.18, \Delta df = 37, \Delta p < .001$, which meant the educated parents of low-income, high-achieving students had perspectives of the concepts in the model different from the group of parents with less than a bachelor's degree. The significant Chi-square difference test assures the rejection of the scalar invariance model. Therefore, only the metric model was interpretable. The answers to the questions in this part were based on the metric model.

Table 21
Fit Indices for Invariance Model Based on Parents' Education

Model	χ^2	df	p	$\Delta\chi^2$	Δdf	Δp	RMSEA	SRMR	CFI	TLI
Less educated	2851.89	610	.00	-	-	-	.06	.06	.79	.77
Bachelor	2327.87	610	.00	-	-	-	.06	.06	.75	.73
Configural	5177.69	1220	.00	-	-	-	.06	.06	.78	.76
Metric	5207.07	1249	.00	28.16	29	.14	.06	.06	.78	.76
Scalar	5343.97	1279	.00	108.09	30	.00	.06	.06	.77	.76

2.2.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

This question asked about the total effects of the two academic engagement measures on low-income, high-achieving students' development of soft professional skills. To do so, the direct effects were interpreted first before the total indirect effect. The direct effect of academic engagement in the first year of college on the engagement in the third year of college (academic engagement 1 → academic engagement 2) was significantly positive for the group with less educated parents , $\beta = .66$, $S.E. = .03$, $p < .001$, as one standardized score unit of increased academic engagement reflected an average increase of .66 standardized score of academic engagement in the third year of college. Similarly, those students whose had at least one parent with a bachelor's degree had significantly increased academic engagement from the first year of college to the third year of college, $\beta = .72$, $S.E. = .04$, $p < .001$. As low-income, high-achieving students of educated parents increased their academic engagement in the first year of college by one standardized score, their academic engagement increased by an average of .72 standardized score in the third year of college.

Moreover, the low-income, high-achieving students of both groups of educated and less educated parents had significant direct effects on academic engagement in the third year of college on developing soft professional skills (academic engagement 2 →

skills). For the group of parents who did not have a bachelor's degrees, academic engagement was a significant predictor for the development of soft professional skills, $\beta = .11, S.E. = .05, p = .03$. With one standardized score increase in academic engagement, there was an average of .11 standardized score better development of soft professional skills for students with less-educated parents. Similarly, the academic engagement in the third year of college of low-income, high-achieving students of parents one of whom had at least a bachelor's degree significantly predicted students' development of soft professional skills, $\beta = .23, S.E. = .07, p < .001$. This meant that one standardized score increase of academic engagement in the third year of college was associated with an average standardized score increase of .23 in the development of soft professional skills for these students of higher educated parents.

Finally, the calculation of the total indirect effect of measuring academic engagement in the first and the third year of college on the development of soft professional skills (academic engagement 1 → academic engagement 2 → skills) for low-income, high-achieving students whose parents did not have a bachelor's degree was significant: $\beta = .07, S.E. = .03, p = .03$. The increase of academic engagement in the first year of college moderated by the academic engagement in the third year of college caused an average increase of .04 of a standardized score in soft professional skills. The group of students who had at least one parent with a bachelor's degree also experienced a significant indirect total effect for both times of measuring academic engagement on the

development of soft professional skills, $\beta = .16$, $S.E. = .05$, $p < .001$, a one standardized score increase of academic engagement in the first year of college was associated with an average of .16 standardized score development of soft professional skills through academic engagement in the third year of college. Generally, low-income, high-achieving students from highly educated or less educated parents developed better soft professional skills as they academically engaged in higher education.

2.2.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

The direct effect of measuring low-income, high-achieving students' social engagement in the first and third year of college (social engagement 1 → social engagement 2) was significant for the students of both highly educated and less educated parents. For students whose parents were less educated, there was a significant association between the two times of social engagement, $\beta = .87$, $S.E. = .03$, $p < .001$. Those whose parents were less educated increased their social engagement by an average of .87 standardized score from the first year to the third. Likewise, students whose parents had a higher education developed better social engagement from the first to the third year of college, $\beta = .97$, $S.E. = .04$, $p < .001$. These students socially engaged on average .97 standardized score in the third year of college as they increased their social engagement by one unit in the first year of college.

Moreover, neither group of low-income, high-achieving students—those whose parents were educated or those whose parents were less educated—showed a significant effect of social engagement in the third year of college on developing soft professional skills (social engagement 2 → skills). Also, the total indirect effect of both measures of social engagement did not significantly affect the development of soft professional skills (social engagement 1 → social engagement 2 → skills), either for students of educated or less educated parents. In conclusion, social engagement did not relate to developing soft professional skills for low-income, high-achieving students from educated or uneducated parents.

2.2.3. How did the challenges that low-income, high-achieving students encountered in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

The direct effect of challenges in the first year of college did not significantly affect the development of soft professional skills (challenges → skills) for either low-income, high-achieving students whose parents were educated or less educated. However, there was a significant negative effect of challenges in the first year of college on their desire to seek support later on (challenges → support) for both groups. For the low-income, high-achieving students of less-educated parents, there was a significant negative effect caused by the challenges these students faced in the first year of college in terms of

their seeking social and academic support: $\beta = -.61, S.E. = .09, p < .01$. In fact, a one standardized score increase of challenges in the first year of college reflected a decrease of .61 standardized score in the willingness of these low-income, high-achieving students of less educated parents to seek social and academic support. Also, the challenges that students of educated parents faced in the first year of college had a negative impact on their tendency to share their academic and social problems: $\beta = -.69, S.E. = .09, p < 001$. As low-income, high-achieving students of educated parents faced a one standardized score increase of challenges in the first year of college, their desire to receive social and academic support decreased by .69 standardized score.

Interestingly, social and academic support helped low-income, high-achieving students of less-educated parents more than those of educated parents. Students of less-educated parents had a significant positive effect of social and academic support on the development of soft professional skills (support → skills), $\beta = .30, S.E. = .09, p < .001$. These students from less-educated parents experienced an increase on average in their soft professional skills of .30 standardized score when they received one increased standardized score of social and academic support. In contrast, there was no significant effect of social and academic support on developing soft professional skills for the children of more highly educated parents.

Finally, although social and academic support had a positive impact on improving soft professional skills for the low-income, high-achieving students of the less educated

parents, challenges in the first year of college negated this relationship considering social and academic support as a mediator. The total indirect effect of challenges in the first year of college on the development of soft professional skills mediated by social and academic support was significantly negative, $\beta = -.18$, $S.E. = .06$, $p < .001$. A one standardized score increase of challenges in the first year of college was associated with an average of .18 standardized score less development of soft professional skills through social and academic support for children of less-educated parents. Correspondingly, there was no significant indirect effect of challenges in the first year of college on developing soft professional skills through social and academic support for children of higher educated parents.

In summary, academic engagement positively impacted the development of soft professional skills for both groups. Also, in both groups, the development of soft professional skills was reduced when students faced more challenges in the first year of college. Low-income, high-achieving students of less-educated parents developed better soft professional skills to find the needed social and academic support. However, challenges in the first year of college that students from less-educated families encountered diminished the effect of the support they received and reduced their development of soft professional skills.

Table 22
Standardized Direct and Indirect Effects for Parents' Education Conditional Model

Effects	Less-educated			Bachelor		
	β	S.E.	p	β	S.E.	p
Direct Effects						
Academic engage1 → Academic engage2	.66	.03	.00	.72	.04	.00
Social engage1 → Social engage2	.50	.08	.00	.56	.07	.00
Social engage2 → Skills	-.02	.07	.71	.04	.10	.67
Academic engage2 → Skills	.11	.05	.03	.23	.07	.00
Support → Skills	.30	.09	.00	.11	.15	.49
Challenges → Skills	-.15	.14	.27	-.22	.25	.37
Challenges → Support	-.61	.09	.00	-.69	.09	.00
Indirect Effects						
Challenges → Support → Skills	-.18	.06	.00	-.07	.11	.49
Academic engage1→Academic engage2→Skills	.07	.03	.03	.16	.05	.00
Social engage1→Social engage→Skills	-.02	.05	.71	.04	.09	.67

The Effect of Race.

2.3.Did race influence the proposed general effects of the development of soft professional skills for low-income, high-achieving students?

The last question in this research was whether low-income, high-achieving students' race affected their attitudes on the components in the model. As in the earlier questions, the starting point was assessing the model fit and measuring the invariance across races. The model for African-American had fit indices of $\chi^2 = 1830.54, df = 610, p < .00; RMSEA = .057 (.054, .060), SRMR = .062, CFI = .80, TLI = 78$, which indicated a usable model (Lai & Green, 2016). The Asian and American-Indian model also had the same level of acceptance of the model fit, $\chi^2 = 2137.41, df = 610, p < .00, RMSEA = .065 (.062, .068), SRMR = .07, CFI = .75, TLI = 73$. The model for low-income, high-achieving Hispanic students was also similar, $\chi^2 = 2132.173, df = 610, p < .00, RMSEA = .065 (.062, .068), SRMR = .08, CFI = .73, TLI = 71$, which again indicated usable and interpretable models (Lai & Green, 2016).

The configural model that leaves all parameters in the model free for estimation had a usable evidence of fit of $\chi^2 = 6089.53, df = 1830, p < .00; RMSEA = .063 (.061, .064), SRMR = .07, CFI = .76, TLI = 74$, which meant this model was interpretable. Moreover, the metric invariance model where loadings were constrained to be equal across the racial groups which had fit indices of $\chi^2 = 6062.37, df = 1888, p < .00; RMSEA = .061 (.059, .063), SRMR = .07, CFI = .77, TLI = 75$, which implied the interpretability of this model. Chi-square difference test with Satorra and Bentler (2010) adjustment between the configural and metric models was not significant, $\Delta\chi^2 = 24.16, \Delta df = 58, \Delta p = .58$, which meant that the indicators load on the latent variables was equal

across the racial groups. Since the metric model was attained, scalar invariance was needed.

The scalar invariance model which constrained the indicators intercepts in addition to the loadings obtained fit indices of $\chi^2 = 6633.49, df = 1962, p < .00, RMSEA = .063 (.062, .065), SRMR = .08, CFI = .74, TLI = 73$, indicated a usable and interpretable model (Lai & Green, 2016). Chi-square test with Satorra and Bentler (2010) adjustment between the metric and scalar models was significant, $\Delta\chi^2 = 571.12, \Delta df = 74, p < .001$, which meant the indicators intercepts differ across the racial groups. Unequal indicators intercept denoted the existence of different cultures of conceptualizing the constructs across the racial groups. Because the scalar invariance was not accepted, the remaining interpretation of the sub-questions was centralized on the metric model.

Table 23
Fit Indices for Invariance Model Based on Race

Model	χ^2	df	p	$\Delta\chi^2$	Δdf	Δp	RMSEA	SRMR	CFI	TLI
African American	1830.54	610	.00	-	-	-	.06	.06	.80	.78
Asian	2137.41	610	.00	-	-	-	.07	.07	.75	.73
Hispanic	2132.17	610	.00	-	-	-	.07	.08	.73	.71
Configural	6089.53	1830	.00	-	-	-	.06	.07	.76	.74
Metric	6062.37	1888	.00	24.16	58	.58	.06	.07	.77	.75
Scalar	6633.49	1962	.00	571.12	74	.00	.06	.07	.75	.74

2.3.1. How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students from different races?

The question was to assess the effect of low-income, high-achieving students academic engagement on developing soft professional skills for different races. Based on the measurement invariance test, the metric model answered the path relationships in the model. The answer involved direct and indirect correlations for each racial group. First, the direct effect of the academic engagement in the first year of college on itself in the third year (academic engagement 1 → academic engagement 2) was positively significant for all tested racial groups (i.e., African American, Asian and Indian American, and Hispanic): $\beta = .70$, *S.E.* $= .04$, $p < .001$; $\beta = .67$, *S.E.* $= .04$, $p < .001$; $\beta = .65$, *S.E.* $= .04$, $p < .001$, respectively. This meant academic engagement increased in the third year of college for African Americans by .70 of a standardized score, for Asians .67 standardized score, and for Hispanic .65 a standardized score as these low-income, high-achieving students increased their academic engagement one standardized score in the first year of college.

Academic engagement in the first year of college was a significant predictor for continuing better academic engagement in the later years. However, academic engagement in the third year of college did not predict the development of soft professional skills (academic engagement 2 → skills) for African American students. The

direct effect of academic engagement in the third year of college on the development of soft professional skills, however, was significant for Asian and Hispanic students: $\beta = .21, S.E. = .07, p = .01$; $\beta = .15, S.E. = .06, p = .01$. That one standardized score increase in academic engagement in the third year of college was associated with an average .21 standardized score increase in the development of soft professional skills for Asian students and a .15 standardized score for Hispanic students.

The total indirect effect of both academic engagement measurements had no significant impact on developing soft professional skills (academic engagement 1 → academic engagement 2 → skills) for African Americans. Controversially, the total indirect effect for Asian and Hispanic low-income, high-achieving students both times of measuring academic engagement significantly predicted the development of soft professional skills: $\beta = .14, S.E. = .05, p < .05$; $\beta = .10, S.E. = .04, p < .05$. Therefore a one standardized score increase in academic engagement predicted an average of .14 standardized score of the development of soft professional skills moderated by academic engagement in the third year of college for Asian students and .10 for Hispanics. The analysis found that low-income, high-achieving Asian and Hispanic students developed soft professional skills through academic engagement, whereas the African American students did not.

2.3.2. How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students from different races?

To assess the effect of social engagement on the development of soft professional skills required testing direct and indirect effects. The direct effect of social engagement in the first year of college on the same measure in the third year of college (social engagement 1 → social engagement 2) was significant for all three racial groups of low-income, high-achieving students. For African Americans, $\beta = .82$, $S.E. = .04$, $p < .001$. When African American students increased their social engagement one standardized score in the first year of college, it increased an average of .82 of a standardized score in the third year of college. For Asian students, $\beta = .95$, $S.E. = .05$, $p < .001$. That one standardized score increase in social engagement in the first year of college was associated with an average increase of .95 standardized score on the social engagement scale in the third year of college. Finally, low-income, high-achieving Hispanic students significantly increased their social engagement over the years, $\beta = .90$, $S.E. = .04$, $p < .001$. When their social engagement increased one standardized score in the first year of college, it increased by an average of .90 in the third year of college.

Moreover, the direct effect of social engagement in the third year of college on the development of soft professional skills (social engagement 2 → skills) was insignificant for all three racial groups of low-income, high-achieving students.

Consequently, there were no significant total indirect effects for both times of measuring social engagement on the development of soft professional skills (social engagement 1 → social engagement 2 → skills) for the three tested races on the low-income, high-achieving students.

2.3.3. How did the challenges that low-income, high-achieving students from different races encountered in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

The direct effect of challenges that low-income, high-achieving students encountered during the first year of college did not significantly affect their development of soft professional skills (challenges → skills) for any of the three racial groups. Additionally, challenges in the first year of college did not significantly affect social and academic support (challenge → support) for those students who were Asian or Hispanic. Controversially, only low-income, high-achieving African Americans had a significant negative impact for the challenges in the first year of college on their tendency to seek social and academic support: $\beta = -.53$, *S.E.* $= .22$, $p = .02$. A standardized score increase of challenges that African American students experienced in the first year of college

signified a decline in their interest in seeking social and academic support by an average of .53 standardized score.

In addition, only low-income, high-achieving Hispanic students had a significant direct effect of social and academic support on the development of soft professional skills (support → skills): $\beta = .35$, $S.E. = .07$, $p < .001$. A standardized score increase of social and academic support reflected an average of .35 of a standardized score for soft professional skills for Hispanic students, whereas, among African American and Asian students, it did not. Moreover, there was no significant total indirect effect of challenges encountered in the first year of college on developing soft professional skills through social and academic support for any of the three tested racial groups of low-income, high-achieving students.

In summary, based on both times of measuring academic engagement, the analysis found a significant effect on developing soft professional skills for low-income, high-achieving Asian and Hispanic students but not on African American students. Social and academic support had a positive effect on the development of soft professional skills in Hispanic students. Challenges reduced low-income, high-achieving African American students' desire to look for social and academic support, but they did not affect Asian and Hispanic students' desire to do so.

Table 24
Direct and Indirect Effects for Race Conditional Model

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Direct Effects									
Academic engage1 → Academic engage2	.70	.04	.00	.67	.04	.00	.65	.04	.00
Social engage1 → Social engage2	.82	.04	.00	.95	.05	.00	.90	.04	.00
Social engage2 → Skills	.02	.08	.79	-.04	.09	.64	-.07	.06	.22
Academic engage2 → Skills	.08	.08	.30	.21	.07	.01	.15	.06	.01
Support → Skills	.03	.18	.85	.14	.10	.17	.35	.07	.00
Challenges → Skills	-.53	.22	.02	-.12	.18	.49	-.01	.08	.93
Challenges → Support	-.69	.10	.00	-.59	.12	.00	-.10	.12	.41
Indirect Effects									
Challenges → Support → Skills	-.02	.12	.85	-.08	.06	.19	-.04	.04	.41
Academic engage1→Academic engage2→Skills	.06	.05	.30	.14	.05	.00	.10	.04	.01
Social engage1→Social engage→Skills	.02	.07	.79	.04	.08	.64	-.06	.05	.22

Chapter 5: Discussion

The current research study included three phases of analysis. The first phase was measurement analysis. In this phase, each construct was assessed with EFA and CFA separately. Then, all the substantive constructs were incorporated into an associative measurement model to examine the model fit. The second phase involved constructing a hybrid structural equation model that tested the structural relationships among the substantive constructs to assess the general effects being explored in the research hypotheses. The last phase examined whether the structural relationships specified in the second phase would vary across the groups defined by the status of obtaining the GMS scholarship, low-income, high-achieving students' parents' level of education, and race.

Measurement Phase

The dataset included the items measuring both social and academic engagement, and challenges that low-income, high-achieving students face in the first year of college. In the third year of college, the two types of engagement were measured again, together with social and academic support, as well as the development of soft professional skills. The EFA suggested dropping several items resulting in a unidimensional structure for each construct. Only the challenge construct was found to yield two sub-constructs--school and social challenges.

All the single construct CFA models showed adequate model fit. School and social challenges were incorporated in a higher-order CFA model that showed a good fit. Some indicator errors were allowed to correlate, supported by previous literature for a better fit. Data collected in the first versus third year of college were analyzed in separate measurement models. Both groups of the measurement models showed adequate fit. However, the associative measurement model that included all the constructs collected in both times did not yield adequate model fit as determined by some fit indices. RMSEA showed a good fit, but CFI was low, thereby proposing a bad fit. Lai and Green (2016) studied this issue and proposed three reasons for the inconsistency between RMSEA and CFI, which were: (1) each index evaluates the model differently, (2) the cutoffs of these indices are arbitrary, (3) the relationship of the decision about a good fit is not well understood. Based on the findings of this study, the decision of the usability of the models was attained. Since the general hybrid model and the following invariances analysis were built on the associative measurement model, they performed similarly regarding fit indices. The same decision was made concerning the usability of the models.

General effect Phase

The second phase of the analysis involved testing the general effect model. This general effect model aimed to study the effect of low-income, high-achieving students'

academic and social engagement on the development of their soft professional skills. The amount of effort and time students devoted to engaging in higher education engagement contributed to their developmental outcomes (Astin, 1999).

The analysis found an increase in both academic and social engagement over the years. Increasing student engagement is one of higher education institutions' goals because it is believed that it may enhance students' development and success (Astin, 1999; Engle & Tinto, 2006; 2014; Kuh et al., 2008). The better students' engagement, the better the educational climate.

How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

Academic engagement helped low-income, high-achieving students increase their soft professional skills. This assured that students would develop their soft professional skills through engaging in the academic environment (Astin, 1999). Therefore, it would be essential to support students' engagement where the engagement is likely to happen (Astin, 1999; Engle & Tinto, 2008; Tinto, 2017). From the practical standpoint, instructors in higher education need to enhance students' engagement in academic activities because it is a critical factor to ensure education efficacy. When students are more engaged, they understand the educational materials better. This research found

evidence supporting the effectiveness of academic engagement in developing soft professional skills. Higher education institutions should consider using multiple strategies to enhance student engagement to assure the fruitful development of the needed soft skills.

How did social engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

The analysis found that social engagement did not contribute significantly to students' soft professional skills development, unlike other research such as Khasanzyanova's (2017) has suggested. It might be because low-income, high-achieving students do not feel a sense of belongingness to their higher education institutions. It might be their background of socioeconomic status that hindered them from being active members of their college communities. Andreas (2016) noted that higher education institutions fail to build social capital because institutional policies prevent some students from engaging in social programs. Also, students who obtained the GMS scholarship tended to go to more prestigious universities (Davis et al., 2013; Hu, 2010), where more students were from higher socioeconomic backgrounds. The current study included all the low-income, high-achieving students with and without the GMS scholarship. The inconsistent results from previous literature might be due to the different student population in the GMS scholarship database. However, Andreas (2018) noted that social

engagement results in better soft professional skills if only received the needed support. This study did not account for support to moderate the relationship between social engagement and the development of soft professional skills.

How did low-income, high-achieving students encounter challenges in the first year of college affect their soft professional skills development?

This research found that challenges that low-income, high-achieving students faced in the first year of college was not a statistically significant predictor of the development of soft professional skills in the third year of college. This indicated these students could overcome the challenges they encountered in the early years of college.

Did social and academic support mediate the relationship between the challenges in the first year of college and the development of soft professional skills? The results indicated that social and academic support helped low-income, high-achieving students develop soft professional skills in college. The research found a moderate level of correlation between support and students' development (Astin, 1999; Cohen & Wills, 1985; Xerri, 2018), contributing to enhancing student development of soft skill development.

When the model added the challenges these students faced in the first year of college, it was found that challenges reduced students' inquiry for academic and social

support. It may be that students do not like to share their difficulties with other people. Additionally, academic and social support was a significant mediator for the relationship between challenges in the first year of college and the development of soft professional skills. The analysis found a negative indirect effect of the challenges in the first year of college on the development of soft professional skills mediated by academic and social support. It appears that when low-income, high-achieving students face fewer challenges in the first year of college, they develop soft professional skills when they receive the needed support and vice versa. Andreas (2018) noted that support is the vehicle for the development of soft professional skills. Therefore, it is crucial to alleviate the challenges that low-income, high-achieving students may face in their first year because it negatively affects the development of their soft professional skills. Astin (1999) and Engle and Tinto (2008) suggested removing barriers that may discourage students' development.

The general effect model was able to identify the relationships between the variables in the models without looking at their background characteristics. This model focused on how low-income, high-achieving students' experience in higher education affected their soft professional skills development. In contrast, the conditional models tested the relationships among the variables across multiple groups as defined by the obtainment of the GMS scholarship, parents' education level, and race.

Conditional Effect Phase

All the conditional effect models matched the results from the general effect model in that they found low-income, high-achieving students continued to be engaging academically and socially over the years in their higher education institutions. This is what higher education aims for by supporting the development of academic and social activities on their campuses. Also, all conditional models did not find an effect of social engagement on developing soft professional skills. Andreas (2018) assured that support is the key to the relationship between social engagement and the development of soft professional skills. This relationship was not tested in the model, which might be the reason for the lack of significance. This is one caveat in this study.

In addition, the conditional models detected the direct effect of the challenges in the first year of college on developing soft professional skills. It was found in the general effect model that the detection of this relationship needs providing academic and social support to mediate this effect. The conditional effect models tested this mediation effect.

The Status of Receiving the GMS scholarship or not

How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

Unlike students who received the GMS scholarship, the academic engagement was significantly predictive of developing soft professional skills for students who did not obtain the GMS scholarship. This finding was different from the hypothesis that because students with the GMS scholarship developed leadership skills as an effect of their engagement (Hu, 2011), and the enhancement was expected to be supported by students' engagement. Oseguera et al. (2008) found that students with the GMS scholarship scaled higher in some of the individual items that accumulate in soft professional skill development. However, they did not test the effect of engagement on the development of these soft professional skills.

How did challenges that low-income, high-achieving students encounter in the first year of college affect their soft professional skills development?

Unlike students who did not receive the GMS scholarship, social and academic support was significantly predictive for the low-income, high-achieving students with the GMS scholarship in developing soft professional skills. Students with the GMS scholarship had more time to spend on campus than those who did not have the GMS scholarship (Hu, 2011). These students use this extra time for socialization and academic activities, which was helpful to increase academic and social support. Direct communications and support are the vehicles for developing soft professional skills (Andreas, 2018). On the other hand, this was not the case for the student who did not

receive the GMS scholarship. These students did not spend the required time for communication on their institution campuses compared to students with the GMS scholarship because they were working off-campus (Hu, 2011), which might be why they did not gain the necessary support. This finding highlights the importance of developing support programs that are inclusive of different students' circumstances.

Did social and academic support mediate the relationship between challenges and the development of soft professional skills?

Even though there was no direct effect of challenges on students' development of soft professional skills, the indirect effect was through academic and social support for students with the GMS scholarship. Challenges in the first year of college was a significant negative predictor for developing soft professional skills mediated by academic and social support for students with the GMS scholarship. Students with fewer challenges in the first year of college developed better soft professional skills when they received academic and social support and vice versa. Although social and academic support significantly enhanced soft professional skills for students with the GMS scholarship, their challenges in the first year of college destroyed this effect, causing a reduction in students' skills. These challenges reduced students' tendency to seek the needed support for all low-income, high-achieving students with the GMS scholarship. Another way to interpret it was that social and academic support could serve as an

effective buffer to offset the negative impact of first year challenges these students experienced on their later soft skill development. Astin (1999), Engle and Tinto (2008) assured that support is mandatory for diminishing challenges students face for a better higher education environment.

However, the model could not detect the direct and indirect effects of challenges in the first year of college on the development of soft professional skills for low-income, high-achieving students who did not receive the GMS scholarship.

The study of the impact of the GMS scholarship may inform higher education scholars in terms of the form of providing financial support for low-income, high-achieving students. For example, it might be efficient to adopt the concept of the scholarship of engagement that aims to engage students in higher education for a better development. scholarship of engagement widens the concept of academic and traditional scholarships to include public scholarship, participatory research, community partnerships, public information networks, and civic literacy scholarship (Checkoway, 2013). This theory of scholarship articulates the elements of this research model into it. It highlights the importance of academic and social engagement, engaging in support activities, and participating in all higher education activities. By pushing students into all these activities, it is expected that they will develop the most of their potentials.

Effects of Parents' Education

How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students?

In addition to the continuity of academic and social engagement, this conditional effect model found that academic engagement effectively enhanced the soft professional skills for children of parents from all educational levels. Even though educated parents tend to support their students academically more (Engberg & Allen, 2011; Hoxby & Turner, 2015), this research discovered that students of less-educated parents develop soft professional skills when they receive social and academic support. Knowing that social and academic support is a key for developing soft professional skills (Andreas, 2018), the effect of social and academic support on the development of soft professional skills for students of less-educated parents is supported. However, this was not the case for students with less-educated parents. The model did not detect the effect of social and academic support on the development of soft professional skills for students from less-educated parents. One argument could be that due to the family upbringing, these students were less used to seeking external support, should it on academic or social.

Did social and academic support mediate this relationship between Challenges in the first year of college and developing soft professional skills?

Challenges in the first year of college had no direct effect on the development of soft professional skills despite of different parents' levels of education. However, the challenges that low-income, high-achieving students faced in the first year of college resulted in less social and academic support for students of parents from all education levels. Students of parents who are more educated were even worse when their coefficients were compared quantitatively.

The indirect effect of challenges in the first year of college was significantly negative on developing soft professional skills for students of less-educated parents. This means that students from less-educated parents who faced fewer challenges in the first year of college developed better soft professional skills. The effect of social and academic support on the development of soft professional skills turned weaker where challenges in the first year of college was added to the model. These findings highlight the need to alleviate challenges that can hinder students' development in higher education institutions (Astin, 1999; Engle & Tinto, 2008). The model did not find this relationship for students from the higher level of education.

The Effect of Race

The last conditional model compared the path effects for different races. Similar to the conditional models for GMS scholarship status and parents' education levels, African Americans, Asians, and Hispanics continued to engage academically and socially

through their college years. Egerton (2002) assured that students tend to continue their higher level of engagement over the years. The model, however, did not find the relationship between social engagement and the development of soft professional skills.

How did academic engagement during the first and third year of college affect the development of soft professional skills for low-income, high-achieving students from different races?

The conditional model on race indicated that African American students did not signify the development of soft professional skills as a result of academic engagement. DesJardson et al. (2010) and Hu (2010; 2011) found that African Americans tended to engage socially more than other racial groups using the same dataset as in the current study. Yet, the current study did not find the connection between social engagement and soft professional skills development, which, unlike academic engagement, led to the development of such skills for African American students. It might be because this racial group preferred to engage socially over academically, so the effect of engagement on their soft professional skills development was not as strong. This suggests that higher education institutes need to develop programs, policies, and plans to enhance this specific racial group's soft professional skills while they are socially engaged. On the other hand, academic engagement helped Asian and Hispanic low-income, high-achieving students to

develop such a skill. It might be because Asians and Hispanic students engage academically more than socially (Hu, 2011; Witkow, 2012).

How did challenges that low-income, high-achieving students from different races encountered in the first year of college affect their soft professional skills development? Did social and academic support mediate this relationship?

The model did not detect the direct or indirect relationships between Challenges in the first year of college and the development of soft professional skills for all races. Only for Hispanic students did social and academic support help develop soft professional skills. Hu (2011) noted that Hispanic students were among the most selected for the GMS scholarship. One of the findings of this research supports the theory that social and academic support helped students with the GMS scholarship in developing soft professional skills. It might be the high probability of being selected for the GMS that is counterfactual to this finding.

There was a significant negative effect of challenges in the first year of college on academic and social support for African American students. This suggested that African American students tend not to talk about their problems with others or seek external support when they face more challenges in the first year of college. As it was suggested earlier, it is important to develop inclusive support programs to help students overcome their challenges.

Summary of the Finding

Whereas the General effect model gave us a general understanding of the effects in the model, the conditional effect models compared the strengths of these relationships across the groups. The general effect model found that low-income, high-achieving students continued to increase their academic and social engagement between their first and third years of college. The more students engage in their higher educational institutions, the more successful they are, which is a sign of a good educational environment (Astin, 1999; Engle & Tinto, 2006; 2014; Kuh et al., 2008). The continuity of engagement in higher education causes an increase in students' development (Astin, 1999).

The academic engagement was a significant positive predictor for the development of soft professional skills. Because students' development happens mostly in classrooms (Astin, 1999), it is important to support effective classrooms (Astin, 1999; Engle & Tinto, 2008; Tinto, 2017). Because students learn soft professional skills through academic engagement, Keow (2019) suggested including these skills in the academic courses.

Unlike academic engagement, social engagement did not predict the development of soft professional skills. Research by Khasanzyanova (2017) contradicts the findings that volunteering in social activities can increase soft professional skills. Andreas (2018) showed that social engagement could not produce soft professional skills unless students received support. The lack of connectivity between them might be due to the model not accounting for the mediation effect of academic and social support.

In the conditional models, low-income, high-achieving students who obtained the GMS scholarship and African Americans did not signify the development of soft professional skills due to their academic engagement. Students without the GMS scholarship, students of parents from all educational levels, Asian and Hispanic students developed these skills as an effect of their academic engagement. Higher education institutes need to design programs that appeal to all students that create opportunities for the development of soft professional skills.

Social and academic support enhanced soft professional skills for low-income, high-achieving students who had the GMS scholarship, whose parents are less educated, and students from Hispanic ethnicity. Among the Hispanic students, the number of students who received the GMS scholarship was higher than nonrecipients (Hu, 2010; 2011). Therefore, social and academic support helped in their development of soft professional skills. However, children of lower-educated parents had a higher chance of

being selected in the GMS scholarship (Hu, 2010; 2011). These students developed soft professional skills when they received the needed social and academic support. Truta et al. (2018) found that students of less-educated parents engaged more in their schools, which provided a better chance of communicating with others. It appeared these students found the needed support while engaging in college, and this was reflected in their development of soft professional skills.

The challenges to being successful in higher education can destroy efforts and programs that higher education institutions make to improve their students. This research found that the challenges that low-income, high-achieving students face in the first year of college diminish these students' ability to obtain social and academic support in general. Only Asian and Hispanic students were not affected in their ability to benefit from academic engagement to develop soft professional skills. It might be that the reason was that the number of selected students to the GMS scholarship exceeded the number of non-selected students. The nature of the invariance analysis that analyses one group of categories contradicts identifying this ambiguity of the interactions among variables.

Students with the GMS scholarships and from less-educated parents developed better soft professional skills when they faced fewer challenges in the first year of college when they received the needed academic and social support. This assures the importance of support programs to help students overcome their problems. It was found in this

research, also, that academic and social support helped these two types of students to develop soft professional skills. However, these positive relationships were nullified when the challenges in the first year of college were included in the model. These findings assure the experts' suggestions, such as Astin (199) and Engle and Tinto (2008), that higher education institutions must reduce challenges that might face low-income students.

Table 25
Summary of Significance in the Study

Effects	General	GMS		Parents' ed		Race		
		Yes	No	Low	High	Black	Asian	Hisp.
Direct Effects								
Academic engage1 → academic engage2	+	+	+	+	+	+	+	+
Social engage1 → social engage2	+	+	+	+	+	+	+	+
Social engage2 → Skills	0	0	0	0	0	0	0	0
Academic engage2 → Skills	+	0	+	+	+	0	+	+
Support → Skills	+	+	0	+	0	0	0	+
Challenges → Skills	0	0	0	0	0	0	0	0
Challenges → Support	-	-	-	-	-	-	0	0
Indirect Effects								
Challenges → Support → Skills	-	-	0	-	0	0	0	0
Academic engage1→Academic engage2→Skills	+	0	+	+	+	0	+	+
Social engage1→Social engage→Skills	0	0	0	0	0	0	0	0

+ significant positive effect at $p < .05$
- significant negative effect at $p < .05$
0 no significant effect at $p < .05$

Limitations of the Study

Finally, like any other research, this research study had several limitations. The data used in this research is secondary data where participants were not randomly selected. In many cases, the number of groups was not equal, which increased the chance of the counterfactual effect. A solution for this would be to use propensity score analysis. However, propensity score analysis is not well developed and is rarely used in conjunction with SEM, especially with latent variables (Guo & Fraser, 2014; Whittaker, 2020).

The nature of invariance analysis limits the analysis to only one intended categorical variable, which introduces confounding variables that affect the statistical decision. In this research, three invariance analyses were conducted separately. Hispanic students and children of less-educated parents had a better chance of being selected in the GMS scholarship (Hu, 2010; 2011). It would be better to use methods that can compute these interaction effects.

In addition, one of the difficulties faced in this research was dealing with missing data. Ideally, multiple imputation techniques would give the most reliable parameter estimation (Teman, 2012). Due to the lack of methodology to pool the fit indices, FIML with the adjustment for missing data and normality MLR was used. MLR is robust even when only three categories are used as in the SEM analysis (Jia & Wu, 2019). However,

the nonrandom missingness in the observed data might hinder the validity of FIML estimates.

Directions for Future Research

This research did not replicate the findings from some other literature that social engagement would enhance students' skills, such as Hu (2010; 2011). The discovered lack of connection between them represents a cavitate that needs to be researched in this specific population of low-income, high-achieving students. It might be efficient to use social and academic support as a mediator since Andreas (2018) noted that social capital would not affect soft skills without direct support for higher education students. This area needs to be tested using an advanced methodology like SEM.

As proposed in the limitations, propensity score analysis is a way to test causality. The methodology is still under development with SEM (Guo & Fraser, 2014). There is an existing way for testing path analysis that needs multiple steps, but development for this technique to be done in one step may be revolutionary. Moreover, there is no efficient way for testing the item-level propensity score with SEM and latent variables (Whittaker, 2020). The development of such a technique will help the research community.

Finally, it was found that MLR is robust with a number of categories as low as three for dealing with missing data (Jia & Wu, 2019). The problem with MLR is that it

treats categorical data as continuous, and we lose information because of that. Teman (2012) found that multiple imputation gives the best estimation among other techniques. The problem is that there is no good way to pool the fit indices. The conduction of such a pooling method will allow the privilege of using such a technique in research.

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Appendices

Appendix A

Table A1
R code for power analysis

```
#Power analysis for CSM

alpha <- 0.05 #alpha level

d <- 614 #degrees of freedom

n <- 1750 #sample size

rmsea0 <- .05 #null hypothesized RMSEA

rmseaa <- .08 #alternative hypothesized RMSEA


#Code below this point need not be changed by user

ncp0 <- (n-1)*d*rmsea0^2

ncpa <- (n-1)*d*rmseaa^2


#Compute power

if(rmsea0<rmseaa) {

  cval <- qchisq(alpha,d,ncp=ncp0,lower.tail=F)

  pow <- pchisq(cval,d,ncp=ncpa,lower.tail=F)

}
```

```
if(rmsea0>rmseaa) {
  cval <- qchisq(1-alpha,d,ncp=ncp0,lower.tail=F)
  pow <- 1-pchisq(cval,d,ncp=ncpa,lower.tail=F)
}
print(pow)
```

Appendix B

Table B1

Descriptive Statistics for Variables in The Analysis

Variable	Analysis	N	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
R diff 1st yr Keep up w/ school work	EFA	1770	1	4	2.71	.903	-.171	-.781
	CFA	1768			2.71	0.66	-0.17	-0.78
R diff 1st yr Managing time	EFA	1770	1	4	2.42	.943	.103	-.885
	CFA	1768			2.42	0.79	0.10	-0.88
R diff 1st yr pay college expense	EFA	1762	1	4	2.55	.975	-.042	-.991
	CFA	-			-	-	-	-
R diff 1st yr managing money	EFA	1764	1	4	2.68	.921	-.162	-.826
	CFA	-			-	-	-	-
R diff 1st yr help w/ school work	EFA	1764	1	4	3.15	.787	-.705	.100
	CFA	-			-	-	-	-
R diff 1st yr make new friends	EFA	1765	1	4	3.23	.849	-.917	.126
	CFA	1763			3.23	0.52	-0.92	0.13
R diff 1st yr comfort living envrn	EFA	1763	1	4	3.14	.886	-.804	-.150
	CFA	1761			3.14	0.62	-0.80	-0.16
R diff 1st yr learn way around	EFA	1768	1	4	3.41	.714	-1.087	.853
	CFA	1766			3.41	0.26	-1.09	0.86
How often R works with other students	EFA	1771	1	6	2.64	1.499	.789	-.266
	CFA	1769			2.64	5.04	0.79	-0.27
How often R discusses ideas with student	EFA	1771	1	6	2.59	1.400	.854	.065
	CFA	1769			2.59	3.83	0.85	0.06
How often R discusses ideas with faculty	EFA	1771	1	6	3.81	1.492	-.027	-.930
	CFA	1769			3.81	4.95	-0.03	-0.93
How often R works harder than expected	EFA	1771	1	6	2.47	1.442	.843	-.182
	CFA	1769			2.47	4.31	0.84	-0.18
How often R works on creative projects	EFA	1771	1	6	3.92	1.742	-.295	-1.231
	CFA	1769			3.92	9.18	-0.30	-1.23
Participate in frat/sorority event	EFA	1742	1	5	2.19	1.301	.839	-.432
	CFA	1741			2.19	2.87	0.84	-0.43

Variable	Analysis	N	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
Participate in residence hall activity	EFA	1763	1	5	2.92	1.295	.070	-1.009
	CFA	1761			2.92	2.82	0.07	-1.01
Participate in event by own culture	EFA	1761	1	5	3.19	1.314	-.098	-1.090
	CFA	1759			3.19	2.98	-0.10	-1.09
Participate in tutoring session	EFA	1765	1	5	2.84	1.305	.166	-1.014
	CFA	1763			2.84	2.90	0.17	-1.02
Participate in community service	EFA	1764	1	5	3.20	1.240	-.103	-.921
	CFA	1762			3.20	2.36	-0.10	-0.92
Participate in religious activity	EFA	1762	1	5	3.01	1.476	.041	-1.383
	CFA	1760			3.01	4.75	0.04	-1.38
Work with students out of class -1FU	EFA	1713	1	6	2.83	1.604	.640	-.682
	CFA	1711			2.83	6.63	0.64	-0.68
Discuss ideas with students out of class -1FU	EFA	1708	1	6	2.73	1.486	.755	-.303
	CFA	1706			2.73	4.88	0.75	-0.31
Discuss ideas with faculty out of class -1FU	EFA	1695	1	6	3.84	1.550	-.072	-1.046
	CFA	1693			3.84	5.77	-0.07	-1.05
Work harder than expected -1FU	EFA	1681	1	6	2.74	1.528	.628	-.589
	CFA	1679			2.74	5.45	0.63	-0.59
Work on creative projects -1FU	EFA	1656	1	6	3.64	1.828	-.071	-1.403
	CFA	1654			3.64	11.14	-0.07	-1.40
Participate in frat/sorority event -1FU	EFA	1600	1	5	2.15	1.372	.927	-.431
	CFA	1598			2.15	3.53	0.93	-0.43
Participate in residence hall activity -1FU	EFA	1604	1	5	2.29	1.289	.688	-.601
	CFA	1602			2.29	2.76	0.69	-0.60
Participate in event by own culture -1FU	EFA	1708	1	5	2.99	1.327	.062	-1.072
	CFA	1706			2.99	3.10	0.06	-1.07
Participate in tutoring session -1FU	EFA	1714	1	5	2.27	1.233	.747	-.393
	CFA	1712			2.27	2.31	0.75	-0.40
	EFA	1711	1	5	3.31	1.270	-.223	-.940

Variable	Analysis	N	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
Participate in community service -1FU	CFA	1709			3.31	2.60	-0.22	-0.94
Participate in religious activity -1FU	EFA	1710	1	5	2.93	1.487	.120	-1.392
	CFA	1708			2.93	4.88	0.12	-1.39
Talk personal problems w/ family member -1FU	EFA	1726	1	5	2.25	1.243	.662	-.654
	CFA	1724			2.25	2.39	0.66	-0.66
Talk personal problems w/ friends -1FU	EFA	1726	1	5	1.98	1.006	.829	.021
	CFA	1724			1.98	1.02	0.83	0.01
Talk personal problems w/ faculty -1FU	EFA	1718	1	5	3.86	1.070	-.611	-.426
	CFA	-			-	-	-	-
Talk personal problems w/ clergy -1FU	EFA	1599	1	5	4.29	1.042	-1.473	1.399
	CFA	-			-	-	-	-
Talk personal problems w/ other -1FU	EFA	883	1	5	3.98	1.385	-1.050	-.315
	CFA	-			-	-	-	-
Talk academic problems w/ family member -1FU	EFA	1705	1	5	3.07	1.406	-.074	-1.253
	CFA	1703			3.07	3.91	-0.07	-1.26
Talk academic problems w/ friends -1FU	EFA	1711	1	5	2.43	1.157	.505	-.519
	CFA	1709			2.43	1.79	0.51	-0.52
Talk academic problems w/ faculty -1FU	EFA	1716	1	5	2.39	1.127	.542	-.364
	CFA	1714			2.39	1.61	0.54	-0.37
Talk academic problems w/ clergy -1FU	EFA	1484	1	5	4.67	.741	-2.620	7.116
	CFA	-			-	-	-	-
Talk academic problems w/ other -1FU	EFA	870	1	5	4.38	1.211	-1.780	1.764
	CFA	-			-	-	-	-
	EFA	1728	1	5	1.52	.728	1.503	2.519

Variable	Analysis	N	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
School help develop analytic skills -1FU	CFA	1726			1.52	0.28	1.50	2.50
School help develop work independently -1FU	EFA	1729	1	5	1.50	.771	1.801	3.628
	CFA	1727			1.50	0.35	1.80	3.61
School help develop communicate orally -1FU	EFA	1729	1	5	1.68	.848	1.397	1.996
	CFA	1727			1.68	0.52	1.39	1.98
School help develop write clearly -1FU	EFA	1729	1	5	1.63	.851	1.432	1.867
	CFA	1727			1.63	0.52	1.43	1.85
School help develop adapt to change -1FU	EFA	1728	1	5	1.43	.717	1.806	3.292
	CFA	1726			1.44	0.27	1.80	3.27

Table B2

Correlation Matrix

	SCW1	TIM1	FRN1	ENV1	WAY1	IDE1	FCL1	HRD1	PRJ1	FRT1	HAL1	CLT1
SCW1	1.00											
TIM1	0.69	1.00										
FRN1	0.18	0.16	1.00									
ENV1	0.20	0.17	0.52	1.00								
WAY1	0.19	0.16	0.36	0.42	1.00							
WST1	0.07	0.05	-0.20	-0.09	-0.06							
IDE1	0.01	0.01	-0.20	-0.11	-0.07	1.00						
FCL1	-0.04	-0.07	-0.13	-0.03	-0.03	0.51	1.00					
HRD1	0.03	-0.01	0.00	0.01	0.00	0.28	0.33	1.00				
PRJ1	-0.06	-0.07	-0.08	0.01	-0.04	0.28	0.40	0.33	1.00			
FRT1	0.04	0.03	0.20	0.08	0.05	-0.09	-0.08	-0.03	-0.08	1.00		
HAL1	0.02	0.02	0.20	0.11	0.09	-0.20	-0.15	-0.08	-0.11	0.29	1.00	
CLT1	0.00	-0.02	0.14	0.02	0.05	-0.20	-0.20	-0.13	-0.13	0.24	0.34	1.00
TUT1	-0.15	-0.11	0.03	-0.02	-0.01	-0.17	-0.25	-0.19	-0.10	0.11	0.17	0.25
COM1	0.08	0.09	0.19	0.09	0.09	-0.22	-0.20	-0.10	-0.20	0.20	0.23	0.37
RLG1	0.06	0.05	0.12	0.06	0.05	-0.13	-0.13	-0.12	-0.14	0.12	0.19	0.31
WST2	0.00	-0.02	-0.12	-0.06	-0.04	0.29	0.25	0.18	0.19	-0.10	-0.16	-0.16
IDE2	-0.02	-0.04	-0.12	-0.08	-0.06	0.37	0.29	0.20	0.20	-0.06	-0.14	-0.14
FCL2	-0.09	-0.08	-0.10	-0.05	-0.04	0.31	0.44	0.22	0.25	-0.08	-0.13	-0.16
HRD2	-0.02	-0.03	0.00	0.00	0.04	0.17	0.24	0.42	0.21	-0.08	-0.04	-0.09
PRJ2	-0.04	-0.04	-0.02	-0.02	0.00	0.20	0.21	0.15	0.35	-0.06	-0.11	-0.09
FRT2	0.07	0.04	0.15	0.06	0.07	-0.09	-0.10	-0.05	-0.06	0.57	0.22	0.21
HAL2	0.05	0.06	0.14	0.06	0.04	-0.17	-0.17	-0.07	-0.09	0.16	0.47	0.22
CLT2	0.05	0.04	0.11	0.04	0.06	-0.14	-0.14	-0.09	-0.08	0.19	0.22	0.59
TUT2	-0.05	-0.04	0.01	-0.03	-0.01	-0.10	-0.20	-0.17	-0.07	0.06	0.07	0.15
COM2	0.06	0.04	0.11	0.07	0.07	-0.15	-0.17	-0.11	-0.14	0.15	0.16	0.27
RLG2	0.07	0.06	0.07	0.04	0.03	-0.06	-0.10	-0.11	-0.12	0.08	0.11	0.22
PFM2	-0.06	-0.01	-0.12	-0.08	-0.04	0.08	0.11	0.14	0.06	-0.06	-0.03	-0.10
PFR2	0.06	0.09	-0.11	-0.07	-0.02	0.10	0.06	0.04	0.04	-0.12	-0.09	-0.08
AFM2	-0.07	-0.03	-0.11	-0.07	-0.03	0.10	0.11	0.12	0.08	-0.05	-0.02	-0.03
AFR2	0.05	0.08	-0.08	-0.05	0.04	0.14	0.07	0.10	0.03	-0.09	-0.07	-0.07
AFC2	-0.10	-0.06	-0.09	-0.09	-0.03	0.14	0.23	0.17	0.12	-0.06	-0.07	-0.13
ANL2	-0.02	-0.01	-0.09	-0.07	-0.01	0.13	0.10	0.10	0.10	-0.05	-0.08	-0.07
IND2	-0.02	-0.01	-0.06	-0.02	0.00	0.12	0.07	0.16	0.05	-0.03	-0.07	-0.05

ORL2	-0.09	-0.10	-0.13	-0.13	-0.05	0.15	0.14	0.13	0.09	-0.08	-0.08	-0.10
WRT2	-0.07	-0.08	-0.08	-0.11	0.01	0.10	0.10	0.09	0.05	-0.07	-0.09	-0.07
CNG2	-0.04	-0.02	-0.10	-0.07	-0.02	0.09	0.05	0.11	0.07	-0.08	-0.09	-0.08

	TUT1	COM1	RLG1	WST2	IDE2	FCL2	HRD2	PRJ2	FRT2	HAL2	CLT2	TUT2
TUT1	1.00											
COM1	0.20	1.00										
RLG1	0.12	0.39	1.00									
WST2	-0.17	-0.15	-0.09	1.00								
IDE2	-0.09	-0.15	-0.09	0.62	1.00							
FCL2	-0.15	-0.16	-0.13	0.48	0.58	1.00						
HRD2	-0.14	-0.09	-0.08	0.34	0.34	0.42	1.00					
PRJ2	-0.07	-0.13	-0.10	0.34	0.33	0.42	0.40	1.00				
FRT2	0.04	0.15	0.07	-0.15	-0.11	-0.09	-0.07	-0.07	1.00			
HAL2	0.08	0.15	0.13	-0.20	-0.24	-0.19	-0.08	-0.16	0.27	1.00		
CLT2	0.15	0.23	0.19	-0.23	-0.20	-0.18	-0.11	-0.11	0.33	0.32	1.00	
TUT2	0.40	0.10	0.09	-0.22	-0.14	-0.21	-0.23	-0.11	0.13	0.15	0.21	1.00
COM2	0.13	0.48	0.29	-0.20	-0.21	-0.20	-0.14	-0.10	0.26	0.24	0.38	0.22
RLG2	0.07	0.25	0.68	-0.10	-0.10	-0.12	-0.09	-0.06	0.11	0.14	0.24	0.13
PFM2	-0.07	-0.12	-0.14	0.08	0.10	0.14	0.15	0.06	-0.07	-0.04	-0.10	-0.07
PFR2	-0.05	-0.12	-0.06	0.09	0.12	0.08	0.06	0.05	-0.14	-0.11	-0.13	-0.06
AFM2	-0.10	-0.09	-0.14	0.11	0.11	0.15	0.17	0.09	-0.06	-0.04	-0.05	-0.07
AFR2	-0.12	-0.12	-0.07	0.21	0.22	0.12	0.16	0.09	-0.13	-0.12	-0.13	-0.14
AFC2	-0.09	-0.15	-0.11	0.18	0.20	0.33	0.26	0.18	-0.10	-0.11	-0.14	-0.17
ANL2	-0.07	-0.09	-0.03	0.19	0.22	0.16	0.17	0.17	-0.03	-0.09	-0.09	-0.05
IND2	-0.08	-0.06	-0.03	0.10	0.13	0.07	0.15	0.09	-0.02	-0.08	-0.08	-0.09
ORL2	-0.07	-0.10	-0.07	0.19	0.20	0.18	0.15	0.16	-0.10	-0.10	-0.14	-0.08
WRT2	-0.06	-0.08	-0.08	0.05	0.15	0.11	0.09	0.08	-0.04	-0.10	-0.08	-0.01
CNG2	-0.07	-0.08	-0.05	0.13	0.14	0.09	0.11	0.11	-0.09	-0.13	-0.10	-0.06

	COM2	RLG2	PFM2	PFR2	AFM2	AFR2	AFC2	ANL2	IND2	ORL2	WRT2	CNG2
CLT2												
TUT2												
COM2	1.00											
RLG2	0.36	1.00										
PFM2	-0.16	-0.16	1.00									
PFR2	-0.14	-0.07	0.35	1.00								
AFM2	-0.09	-0.17	0.59	0.24	1.00							
AFR2	-0.15	-0.08	0.31	0.55	0.38	1.00						
AFC2	-0.18	-0.11	0.29	0.24	0.26	0.26	1.00					
ANL2	-0.10	-0.05	0.14	0.14	0.09	0.15	0.17	1.00				
IND2	-0.07	-0.04	0.11	0.12	0.11	0.14	0.11	0.45	1.00			
ORL2	-0.11	-0.11	0.14	0.13	0.14	0.14	0.20	0.45	0.45	1.00		
WRT2	-0.08	-0.08	0.14	0.09	0.12	0.12	0.19	0.47	0.39	0.56	1.00	
CNG2	-0.10	-0.03	0.12	0.17	0.11	0.15	0.13	0.38	0.46	0.43	0.39	1.00

Appendix C

Figure C1
Metric Model for Scholars

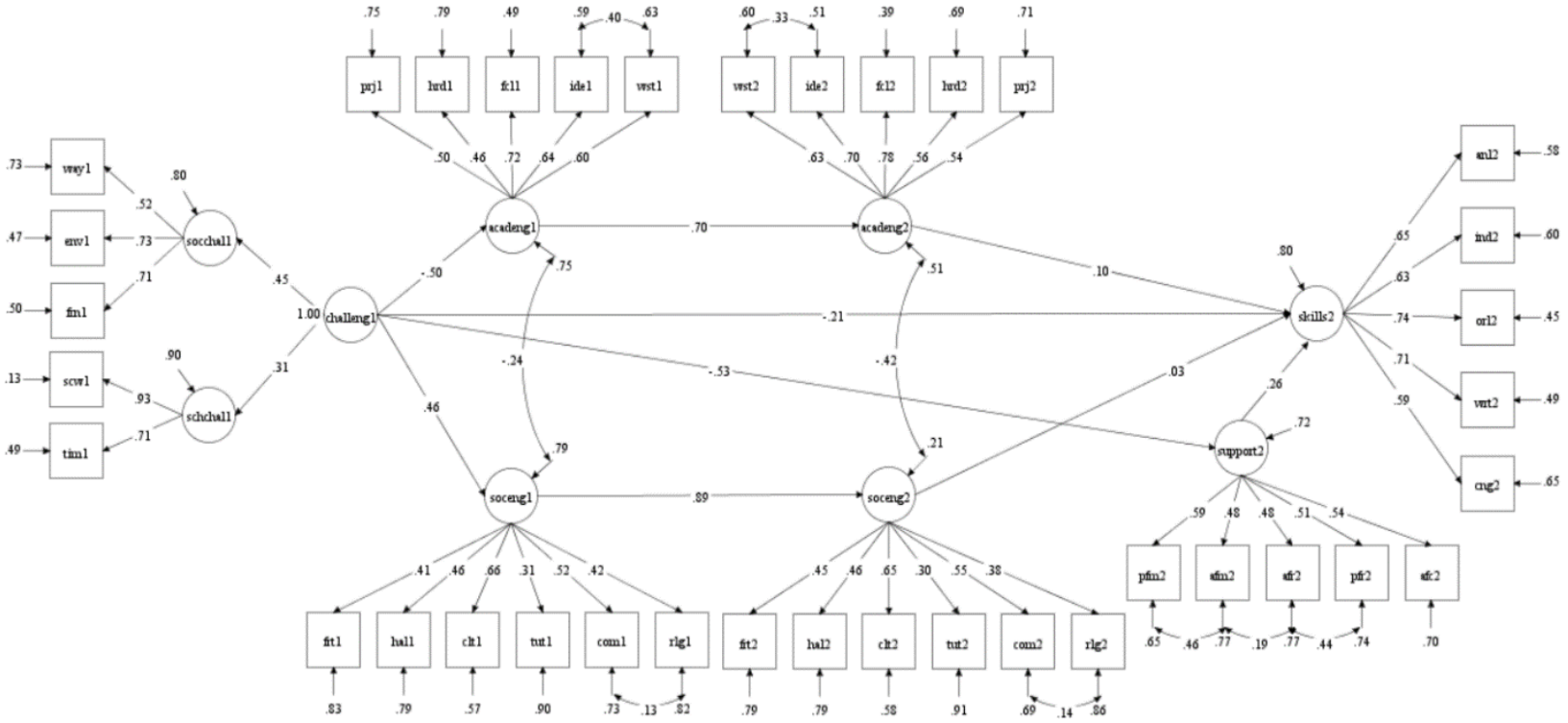


Figure C2

Metric Model for Non-scholars

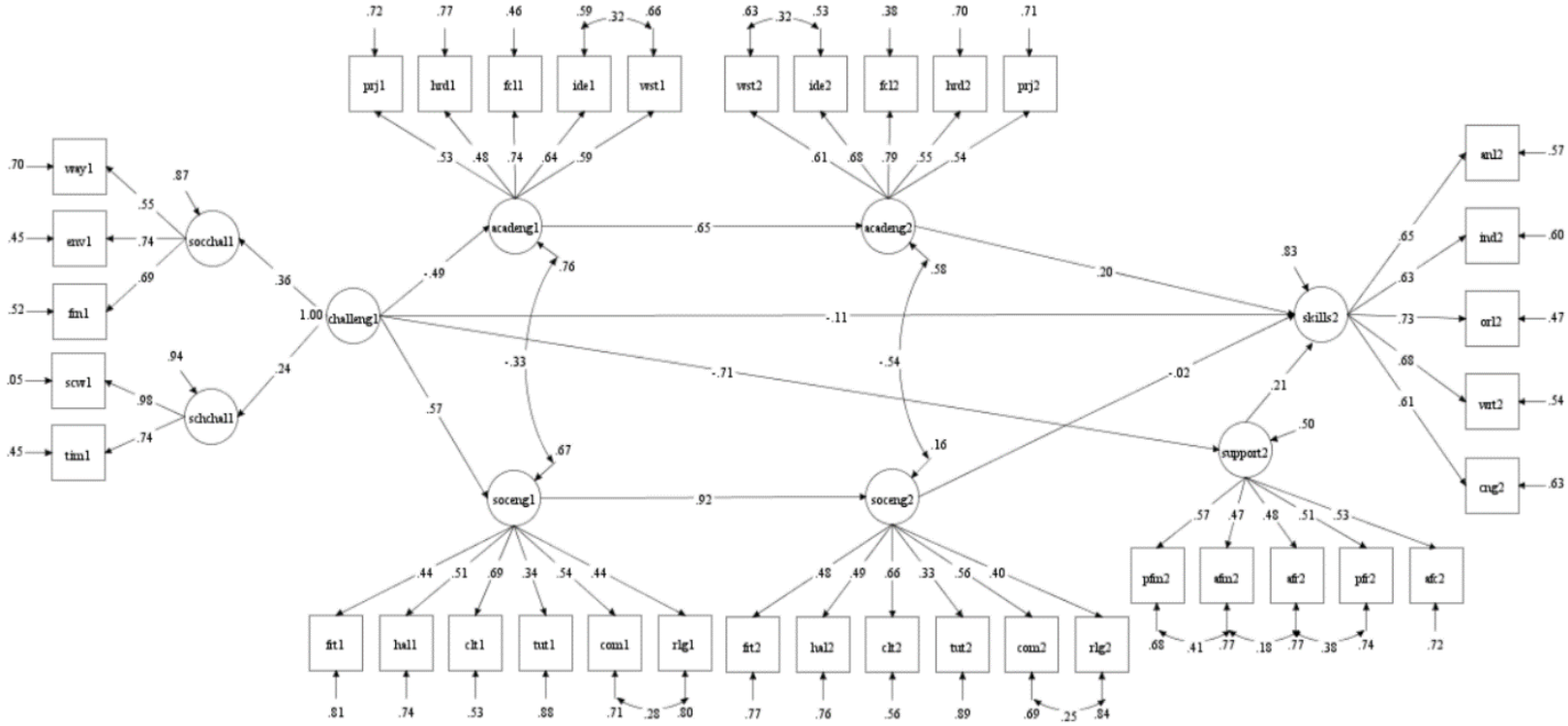


Figure C3
Metric Model for Less Educated Parents

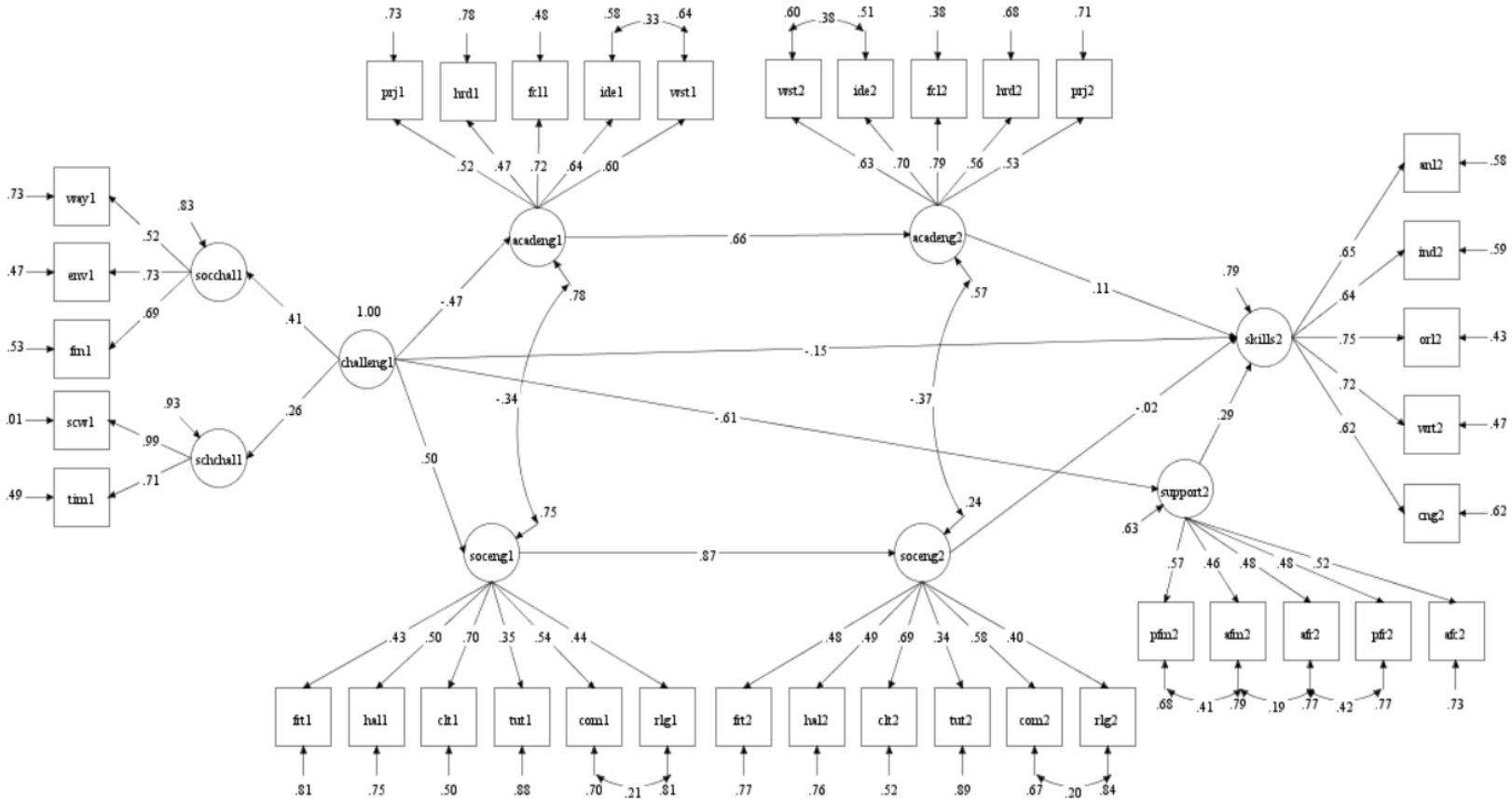


Figure C4
Metric Model for Parents with Bachelors

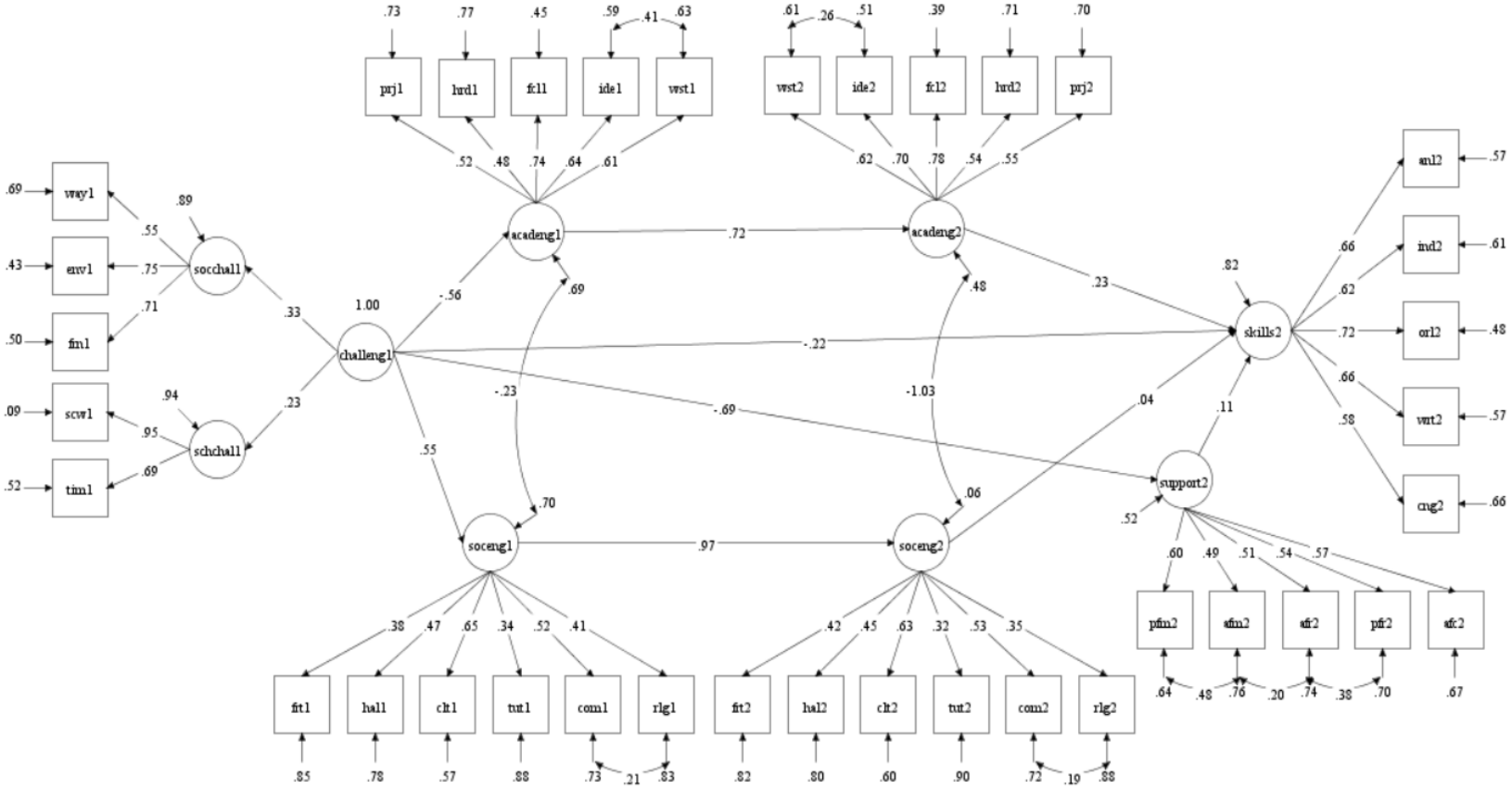


Figure C5
Metric Race Africans

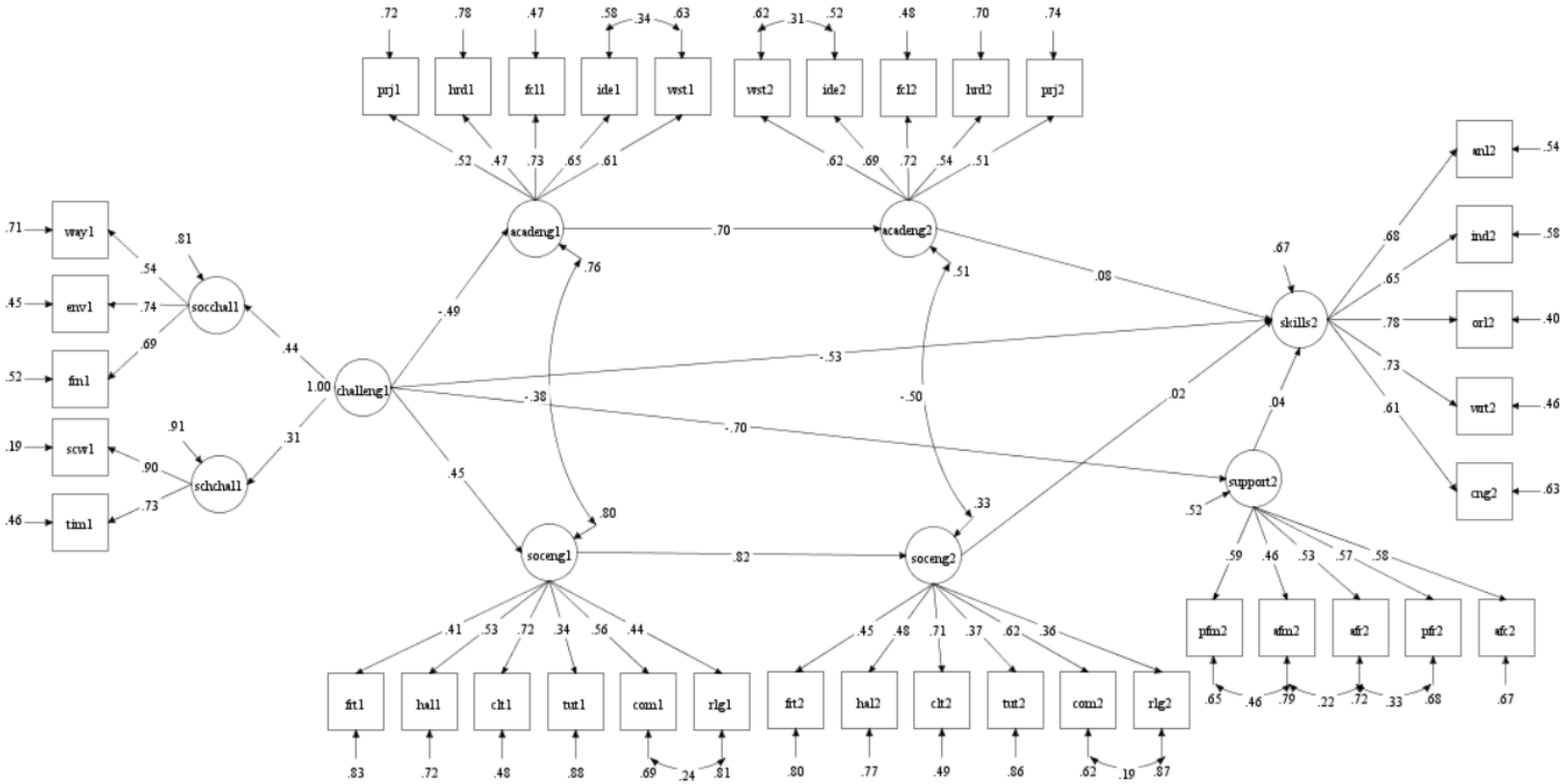


Figure C6
Metric Race Indian & Asian

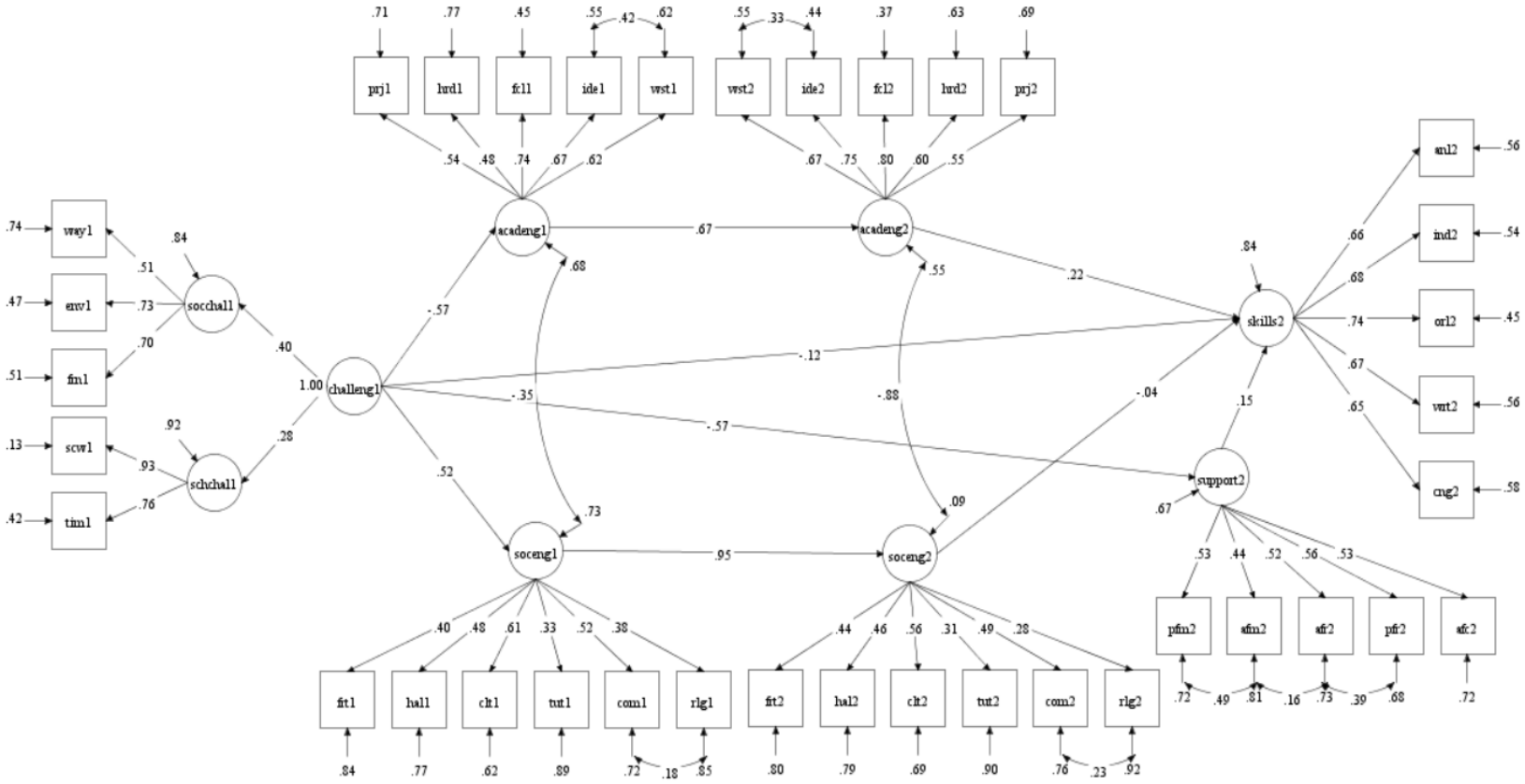
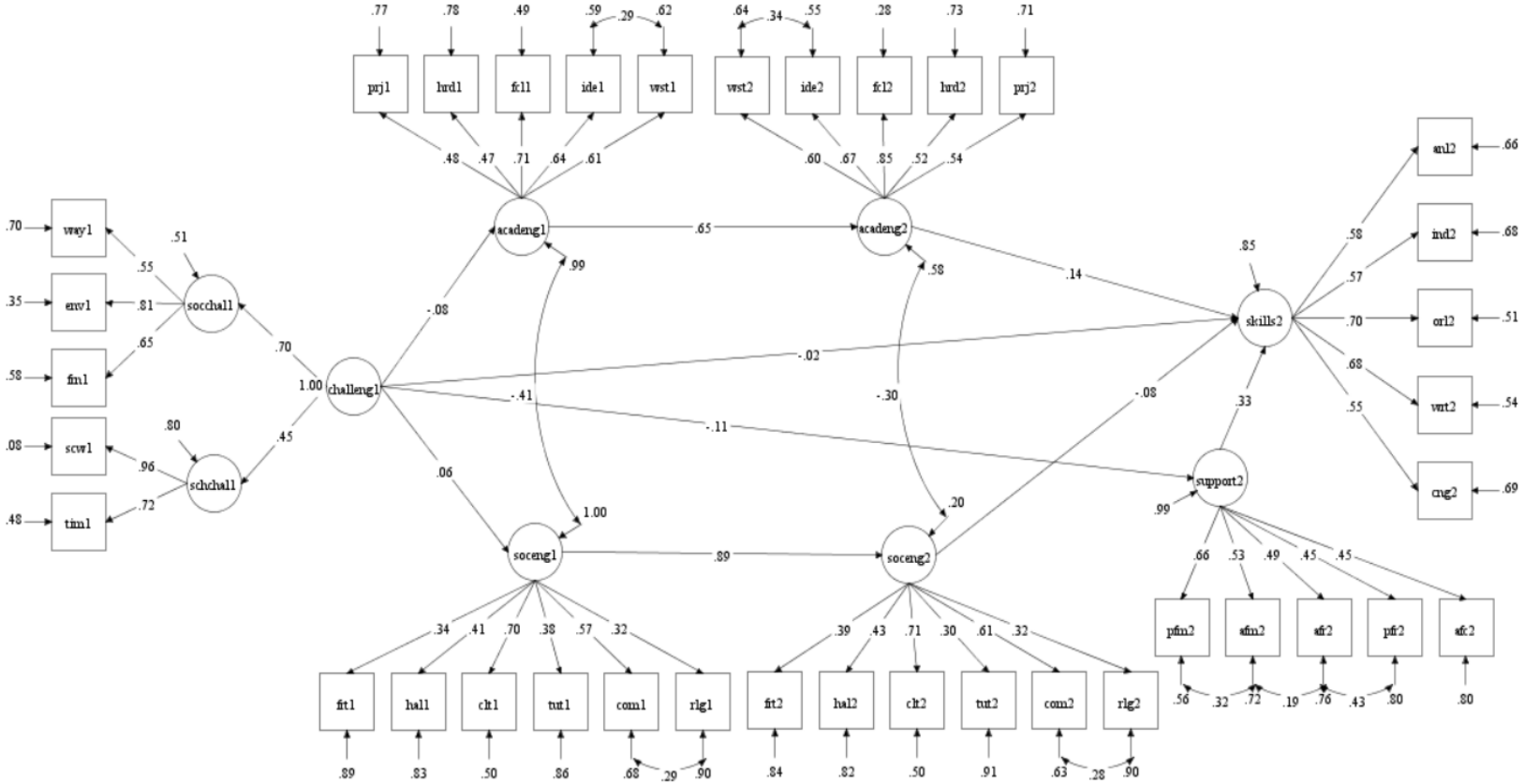


Figure C7
Metric Race Hispanic



Appendix D

Table D1
Model Results for Challenges Covariance model

Estimate	β	S.E.	p
Loading			
Social Challenges → FRN1	.68	.02	.00
Social Challenges → ENV1	.76	.03	.00
Social Challenges → WAY1	.55	.03	.00
School Challenges → SCW1	.90	.04	.00
School Challenges → TIM1	.77	.03	.00
Covariance			
School Challenges ↶↷ Social Challenges	.31	.03	.00
Intercepts			
SCW1	3.00	.05	.00
TIM1	2.57	.04	.00
FRN1	3.81	.08	.00
ENV1	3.55	.07	.00
WAY1	4.78	.11	.00
Variance			
School Challenges	1.00	.00	--
Social Challenges	1.00	.00	--
Residuals			
SCW1	.20	.07	.00
TIM1	.41	.05	.00
FRN1	.54	.03	.00

Estimate	β	S.E.	p
ENV1	.42	.04	.00
WAY1	.70	.03	.00

Table D2
Model Results for Challenges Higher-Order model

Estimate	β	S.E.	p
Loading			
Social Challenges → FRN1	.68	.02	.00
Social Challenges → ENV1	.76	.03	.00
Social Challenges → WAY1	.55	.03	.00
School Challenges → SCW1	.90	.04	.00
School Challenges → TIM1	.77	.03	.00
Challenges1 → School Challenges	.66	.04	.00
Challenges1 → Social Challenges	.47	.03	.00
Intercepts			
SCW1	3.00	.05	.00
TIM1	2.57	.04	.00
FRN1	3.81	.08	.00
ENV1	3.55	.07	.00
WAY1	4.78	.11	.00
Variance			
Challenges1	1.00	.00	--
Residuals			
SCW1	.20	.07	.00
TIM1	.41	.05	.00

Estimate	β	S.E.	p
FRN1	.54	.03	.00
ENV1	.42	.04	.00
WAY1	.70	.03	.00

Table D3
Model Results for Academic Engagement in The First Year of College

Estimate	β	S.E.	p
Loading			
Academic Engagement 1 → WKST1	.56	.02	.00
Academic Engagement 1 → IDEA1	.63	.02	.00
Academic Engagement 1 → FACL1	.77	.02	.00
Academic Engagement 1 → HARD1	.47	.03	.00
Academic Engagement 1 → PROJ1	.52	.02	.00
Covariance			
IDEA1 ↶↷ WKST1	.40	.03	.00
Intercepts			
WKST1	1.76	.02	.00
IDEA1	1.85	.03	.00
FACL1	2.56	.04	.00
HARD1	1.72	.02	.00
PROJ1	2.25	.04	.00
Variance			
Academic Engagement 1	1.00	.00	--
Residual Variances			

Estimate	β	S.E.	p
WKST1	.69	.03	.00
IDEA1	.60	.03	.00
FACL1	.41	.03	.00
HARD1	.78	.02	.00
PROJ1	.73	.03	.00

Table D 4

Model Results for Social Engagement in The First Year of College

Estimate	β	S.E.	p
Loading			
Social Engagement 1 → FRAT1	.40	.03	.00
Social Engagement 1 → HAL1	.50	.03	.00
Social Engagement 1 → CULT1	.69	.03	.00
Social Engagement 1 → TUT1	.35	.03	.00
Social Engagement 1 → COM1	.52	.03	.00
Social Engagement 1 → RELG1	.41	.03	.00
Covariance			
RELG1 ↶↷ COM1	.22	.03	.00
Intercepts			
FRAT1	1.69	.02	.00
HAL1	2.25	.04	.00
CULT1	2.43	.04	.00
TUT1	2.17	.03	.00
COM1	2.58	.04	.00
RELG1	2.04	.03	.00

Estimate	β	S.E.	p
Variances			
Social Engagement	1.00	.00	--
Residual Variances			
FRAT1	.84	.02	.00
HAL1	.75	.03	.00
CULT1	.52	.04	.00
TUT1	.88	.02	.00
COM1	.73	.03	.00
RELG1	.83	.02	.00

Table D5

Model Results for Academic and Social Engagement in The First Year of College

Estimate	β	S.E.	p
Loading			
Academic Engagement 1 → WKST1	.60	.02	.00
Academic Engagement 1 → IDEA1	.65	.02	.00
Academic Engagement 1 → FACL1	.74	.02	.00
Academic Engagement 1 → HARD1	.47	.03	.00
Academic Engagement 1 → PROJ1	.52	.02	.00
Social Engagement 1 → FRAT1	.38	.03	.00
Social Engagement 1 → HAL1	.50	.03	.00
Social Engagement 1 → CULT1	.66	.02	.00
Social Engagement 1 → TUT1	.39	.03	.00
Social Engagement 1 → COM1	.54	.03	.00
Social Engagement 1 → RELG1	.41	.03	.00
Covariance			

Estimate	β	S.E.	p
Academic Engagement 1 ↔ Social Engagement 1	-.51	.03	.00
IDEA1 ↔ WKST1	.36	.03	.00
RELG1 ↔ COM1	.22	.03	.00
Intercepts			
WKST1	1.76	.02	.00
IDEA1	1.85	.03	.00
FACL1	2.56	.04	.00
HARD1	1.72	.02	.00
PROJ1	2.25	.04	.00
FRAT1	1.69	.02	.00
HAL1	2.25	.04	.00
CULT1	2.43	.04	.00
TUT1	2.17	.03	.00
COM1	2.58	.04	.00
RELG1	2.04	.03	.00
Variance			
Academic Engagement 1	1.00	.00	--
Social Engagement 1	1.00	.00	--
Residual Variances			
WKST1	.64	.03	.00
IDEA1	.58	.03	.00
FACL1	.45	.03	.00
HARD1	.78	.02	.00
PROJ1	.73	.03	.00

Estimate	β	S.E.	p
FRAT1	.85	.02	.00
HAL1	.75	.03	.00
CULT1	.56	.03	.00
TUT1	.85	.02	.00
COM1	.71	.03	.00
RELG1	.83	.02	.00

Table D6

Model Results for The Associative measurement Model in the First Year of College

Estimate	β	S.E.	p
Loading			
Social Challenges → FRN1	.69	.02	.00
Social Challenges → ENV1	.74	.03	.00
Social Challenges → WAY1	.55	.03	.00
School Challenges → SCW1	.90	.04	.00
School Challenges → TIM1	.77	.03	.00
Challenges1 → School Challenges	.67	.04	.00
Challenges1 → Social Challenges	.47	.03	.00
Academic Engagement 1 → WKST1	.60	.02	.00
Academic Engagement 1 → IDEA1	.65	.02	.00

Estimate	β	S.E.	p
Academic Engagement 1 → FACL1	.74	.02	.00
Academic Engagement 1 → HARD1	.46	.03	.00
Academic Engagement 1 → PROJ1	.52	.02	.00
Social Engagement 1 → FRAT1	.39	.03	.00
Social Engagement 1 → HAL1	.51	.03	.00
Social Engagement 1 → CULT1	.65	.02	.00
Social Engagement 1 → TUT1	.38	.03	.00
Social Engagement 1 → COM1	.55	.03	.00
Social Engagement 1 → RELG1	.41	.03	.00
<u>Covariance</u>			
Academic Engagement 1 ↶↷ Social Engagement 1	-.19	.05	.00
Academic Engagement 1 ↶↷ Challenges 1	.27	.05	.00
Social Engagement 1 ↶↷ Challenges 1	-.51	.03	.00
IDEA1 ↶↷ WKST1	.36	.03	.00
RELG1 ↶↷ COM1	.21	.03	.00
<u>Intercepts</u>			
SCW1	2.98	.05	.00
TIM1	2.56	.04	.00
FRN1	3.84	.08	.00
ENV1	3.56	.07	.00
WAY1	4.79	.11	.00
WKST1	1.76	.02	.00
IDEA1	1.85	.03	.00
FACL1	2.56	.04	.00

Estimate	β	S.E.	p
HARD1	1.72	.02	.00
PROJ1	2.25	.04	.00
FRAT1	1.69	.02	.00
HAL1	2.25	.04	.00
CULT1	2.43	.04	.00
TUT1	2.17	.03	.00
COM1	2.58	.04	.00
RELG1	2.04	.03	.00
Variance			
Challenges	1.00	.00	--
Academic Engagement 1	1.00	.00	--
Social Engagement 1	1.00	.00	--
Residual Variances			
SCW1	.18	.06	.00
TIM1	.41	.05	.00
FRN1	.53	.03	.00
ENV1	.45	.04	.00
WAY1	.70	.03	.00
WKST1	.64	.03	.00
IDEA1	.58	.03	.00
FACL1	.45	.03	.00
HARD1	.79	.02	.00
PROJ1	.73	.03	.00
FRAT1	.85	.02	.00
HAL1	.74	.03	.00

Estimate	β	S.E.	p
CULT1	.58	.03	.00
TUT1	.86	.02	.00
COM1	.70	.03	.00
RELG1	.83	.02	.00
Social Challenges 1	.55	.05	.00
School Challenges 1	.78	.03	.00

Table D7

Model Results for Academic Engagement in The Third Year of College

Estimate	β	S.E.	p
Loading			
Academic Engagement 2 → WKST2	.61	.02	.00
Academic Engagement 2 → IDEA2	.69	.02	.00
Academic Engagement 2 → FACL2	.80	.02	.00
Academic Engagement 2 → HARD2	.55	.02	.00
Academic Engagement 2 → PROJ2	.54	.03	.00
Covariance			
IDEA2 ↶↷ WKST2	.35	.03	.00
Intercepts			
WKST2	1.77	.02	.00
IDEA2	1.84	.03	.00
FACL2	2.48	.04	.00
HARD2	1.79	.02	.00
PROJ2	2.00	.03	.00
Variance			

Estimate	β	S.E.	p
Academic Engagement 2	1.00	.00	--
Residual Variances			
WKST2	.63	.03	.00
IDEA2	.52	.02	.00
FACL2	.36	.03	.00
HARD2	.70	.03	.00
PROJ2	.71	.03	.00

Table D8

Model Results for Social Engagement in The Third Year of College

Estimate	β	S.E.	p
Loading			
Social Engagement 2 → FRAT2	.48	.03	.00
Social Engagement 2 → HAL2	.47	.03	.00
Social Engagement 2 → CULT2	.68	.03	.00
Social Engagement 2 → TUT2	.32	.03	.00
Social Engagement 2 → COM2	.55	.03	.00
Social Engagement 2 → RELG2	.32	.03	.00
Covariance			
RELG2 ↶↷ COM2	.24	.03	.00
Intercepts			
FRAT2	1.57	.02	.00
HAL2	1.78	.02	.00
CULT2	2.26	.04	.00

Estimate	β	S.E.	p
TUT2	1.84	.02	.00
COM2	2.60	.04	.00
RELG2	1.97	.03	.00
Variances			
Social Engagement 2	1.00	.00	--
Residual Variances			
FRAT2	.77	.03	.00
HAL2	.78	.03	.00
CULT2	.54	.03	.00
TUT2	.90	.02	.00
COM2	.70	.03	.00
RELG2	.90	.02	.00

Table D9

Model Results for Academic and Social Engagement in The Third Year of College

Estimate	β	S.E.	p
Loading			
Academic Engagement 2 → WKST2	.63	.02	.00
Academic Engagement 2 → IDEA2	.70	.02	.00
Academic Engagement 2 → FACL2	.79	.02	.00
Academic Engagement 2 → HARD2	.55	.02	.00
Academic Engagement 2 → PROJ2	.54	.02	.00

Estimate	β	S.E.	p
Social Engagement 2 → FRAT2	.46	.03	.00
Social Engagement 2 → HAL2	.49	.03	.00
Social Engagement 2 → CULT2	.65	.02	.00
Social Engagement 2 → TUT2	.35	.03	.00
Social Engagement 2 → COM2	.56	.03	.00
Social Engagement 2 → RELG2	.33	.03	.00
Covariance			
Academic Engagement 2 ↶↷ Social Engagement 2	-.45	.03	.00
IDEA2 ↶↷ WKST2	.33	.03	.00
RELG2 ↶↷ COM2	.23	.03	.00
Intercepts			
WKST2	1.77	.02	.00
IDEA2	1.84	.03	.00
FACL2	2.48	.04	.00
HARD2	1.80	.02	.00
PROJ2	2.00	.03	.00
FRAT2	1.57	.02	.00
HAL2	1.78	.02	.00
CULT2	2.26	.04	.00
TUT2	1.84	.02	.00
COM2	2.60	.04	.00
RELG2	1.97	.03	.00
Variance			
Academic Engagement 2	1.00	.00	--

Estimate	β	S.E.	p
Social Engagement 2	1.00	.00	--
Residual Variances			
WKST2	.60	.03	.00
IDEA2	.51	.03	.00
FACL2	.38	.03	.00
HARD2	.70	.02	.00
PROJ2	.71	.03	.00
FRAT2	.79	.02	.00
HAL2	.76	.03	.00
CULT2	.58	.03	.00
TUT2	.88	.02	.00
COM2	.69	.03	.00
RELG2	.89	.02	.00

Table D10
Model Results for Academic and Social Support

Estimate	β	S.E.	p
Loading			
Academic & Social Support 2 → PFAM2	.63	.03	.00
Academic & Social Support 2 → AFAM2	.49	.04	.00
Academic & Social Support 2 → AFRND2	.50	.04	.00

Estimate	β	S.E.	p
Academic & Social Support 2 →			
PFRND2	.53	.04	.00
Academic & Social Support 2 → AFAC2	.47	.03	.00
Covariance			
AFRND2 ↷ PFRND2	.39	.04	.00
AFRND2 ↷ PFAM2	.19	.02	.00
AFAM2 ↷ PFAM2	.42	.04	.00
Intercepts			
PFAM2	1.81	.02	.00
PFRND2	1.97	.03	.00
AFAM2	2.19	.04	.00
AFRND2	2.10	.03	.00
AFAC2	2.12	.03	.00
Variances			
Academic & Social Support 2	1.00	.00	--
Residual Variances			
PFAM2	.60	.04	.00
PFRND2	.72	.04	.00
AFAM2	.77	.03	.00
AFRND2	.75	.04	.00
AFAC2	.78	.03	.00

Table D11
Model Results for Soft Professional Skills

Estimate	β	S.E.	p
Loading			
Soft Professional Skills 2 → ANL2	.65	.02	.00
Soft Professional Skills 2 → IND2	.64	.03	.00
Soft Professional Skills 2 → ORL2	.74	.02	.00
Soft Professional Skills 2 → WRT2	.70	.02	.00
Soft Professional Skills 2 → CHNG2	.60	.03	.00
Intercepts			
ANL2	2.09	.04	.00
IND2	1.95	.04	.00
ORL2	1.98	.04	.00
WRT	1.92	.03	.00
CHNG2	2.00	.04	.00
Variances			
Skills 2	1.00	.00	--
Residual Variances			
ANL2	.58	.03	.00
IND2	.59	.04	.00
ORL2	.46	.03	.00
WRT2	.51	.03	.00
CHNG2	.64	.03	.00

Table D12
Model Results for The Associative measurement Model in the Third Year of College

Estimate	β	S.E.	p
Loading			
Academic Engagement 2 → WKST2	.63	.02	.00
Academic Engagement 2 → IDEA2	.70	.02	.00
Academic Engagement 2 → FACL2	.78	.02	.00
Academic Engagement 2 → HARD2	.56	.02	.00
Academic Engagement 2 → PROJ2	.54	.02	.00
Social Engagement 2 → FRAT2	.46	.03	.00
Social Engagement 2 → HAL2	.48	.03	.00
Social Engagement 2 → CULT2	.64	.02	.00
Social Engagement 2 → TUT2	.36	.03	.00
Social Engagement 2 → COM2	.57	.03	.00
Social Engagement 2 → RELG2	.34	.03	.00
Social & Academic Support 2 → PFAM2	.54	.03	.00
Social & Academic Support 2 → AFAM2	.45	.03	.00
Social & Academic Support 2 → AFRND2	.51	.03	.00
Social & Academic Support 2 → PFRND2	.49	.04	.00
Social & Academic Support 2 → AFAC2	.57	.03	.00
Soft Professional Skills 2 → ANLT2	.65	.02	.00
Soft Professional Skills 2 → INDP2	.64	.03	.00
Soft Professional Skills 2 → ORAL2	.74	.02	.00
Soft Professional Skills 2 → WRIT2	.69	.02	.00
Soft Professional Skills 2 → CHNG2	.60	.03	.00
Covariance			

Estimate	β	S.E.	p
Social Engagement 2 ↔ Academic engagement 2	-.45	.03	.00
Social Engagement 2 ↔ Social & Academic Support 2	.45	.04	.00
Social Engagement 2 ↔ Sort Professional Skills 2	-.43	.04	.00
Academic Engagement 2 ↔ Social & Academic Support 2	.30	.03	.00
Academic Engagement 2 ↔ Soft Professional skills 2	-.24	.03	.00
Social & Academic Support 2 ↔ Soft Professional Skills 2	.40	.04	.00
IDEA2 ↔ WKST2	.33	.03	.00
RELG2 ↔ COM2	.22	.03	.00
AFAM2 ↔ PFAM2	.46	.03	.00
AFRND2 ↔ PFRND2	.40	.03	.00
AFRND2 ↔ AFAM2	.18	.02	.00
<u>Intercepts</u>			
WKST2	1.77	.02	.00
DEA2	1.84	.03	.00
FACL2	2.48	.04	.00
HARD2	1.80	.02	.00
PROJ2	2.00	.03	.00
FRAT2	1.57	.02	.00
HAL2	1.78	.02	.00
CULT2	2.25	.04	.00
TUT2	1.84	.02	.00
COM2	2.60	.04	.00

Estimate	β	S.E.	p
RELG2	1.97	.03	.00
PFAM2	1.81	.02	.00
PFRND2	1.97	.03	.00
AFAM2	2.19	.04	.00
AFRND2	2.10	.03	.00
AFAC2	2.13	.03	.00
ANLT2	2.09	.04	.00
INDP2	1.95	.04	.00
ORAL2	1.98	.04	.00
WRIT2	1.92	.03	.00
CHNG2	2.00	.04	.00
Variances			
Academic Engagement 2	1.00	.00	--
Social Engagement 2	1.00	.00	--
Social & Academic Support 2	1.00	.00	--
Soft Professional Skills 2	1.00	.00	--
Residual Variances			
WKST2	.61	.03	.00
DEA2	.51	.03	.00
FACL2	.39	.03	.00
HARD2	.69	.02	.00
PROJ2	.71	.03	.00
FRAT2	.79	.02	.00
HAL2	.77	.03	.00
CULT2	.59	.03	.00

Estimate	β	S.E.	p
TUT2	.87	.02	.00
COM2	.68	.03	.00
RELG2	.89	.02	.00
PFAM2	.71	.04	.00
PFRND2	.76	.04	.00
AFAM2	.80	.03	.00
AFRND2	.75	.03	.00
AFAC2	.67	.04	.00
ANLT2	.58	.03	.00
INDP2	.60	.03	.00
ORAL2	.45	.03	.00
WRIT2	.52	.03	.00
CHNG2	.64	.03	.00

Table D13
Model Results for The Measurement Model

Estimate	β	S.E.	p
Loading			
Social Challenges → FRN1	.69	.02	.00
Social Challenges → ENV1	.75	.03	.00
Social Challenges → WAY1	.54	.03	.00
School Challenges → SCW1	.91	.04	.00
School Challenges → TIM1	.76	.03	.00
Challenges 1 → Social Challenges	.67	.04	.00

Estimate	β	S.E.	p
Challenges 1 → School Challenges	.47	.03	.00
Academic Engagement 1 → WKST1	.61	.02	.00
Academic Engagement 1 → IDEA1	.65	.02	.00
Academic Engagement 1 → FACL1	.73	.02	.00
Academic Engagement 1 → HARD1	.48	.02	.00
Academic Engagement 1 → PROJ1	.52	.02	.00
Social Engagement 1 → FRAT1	.61	.02	.00
Social Engagement 1 → HAL1	.65	.02	.00
Social Engagement 1 → CULT1	.73	.02	.00
Social Engagement 1 → TUT1	.48	.02	.00
Social Engagement 1 → COM1	.52	.02	.00
Social Engagement 1 → RELG1	.61	.02	.00
Academic Engagement 2 → WKST2	.62	.02	.00
Academic Engagement 2 → IDEA2	.70	.02	.00
Academic Engagement 2 → FACL2	.79	.02	.00
Academic Engagement 2 → HARD2	.56	.02	.00
Academic Engagement 2 → PROJ2	.54	.02	.00
Social Engagement 2 → FRAT2	.46	.03	.00
Social Engagement 2 → HAL2	.47	.03	.00
Social Engagement 2 → CULT2	.67	.02	.00
Social Engagement 2 → TUT2	.33	.03	.00
Social Engagement 2 → COM2	.56	.02	.00
Social Engagement 2 → RELG2	.39	.03	.00
Social & Academic Support 2 → AFAC2	.58	.03	.00
Social & Academic Support 2 → PFAM2	.54	.03	.00

Estimate	β	S.E.	p
Social & Academic Support 2 → AFAM2	.45	.03	.00
Social & Academic Support2 → AFRND2	.50	.03	.00
Social & Academic Support 2 → PFRND2	.48	.04	.00
Soft Professional Skills 2 → ANLT2	.65	.02	.00
Soft Professional Skills 2 → INDP2	.63	.03	.00
Soft Professional Skills 2 → ORAL2	.74	.02	.00
Soft Professional Skills 2 → WRIT2	.70	.02	.00
Soft Professional Skills 2 → CHNG	.60	.03	.00
Covariance			
Challenges 1 ↶↷ Academic Engagement 1	-.19	.05	.00
Challenges 1 ↶↷ Social Engagement 1	.27	.05	.00
Challenges 1 ↶↷ Academic Engagement 2	-.50	.03	.00
Challenges 1 ↶↷ Social Engagement 2	-.18	.05	.00
Challenges 1 ↶↷ Social & Academic Support 2	.66	.03	.00
Challenges 1 ↶↷ Soft Professional Skills 2	-.34	.03	.00
Social Engagement 1 ↶↷ Academic engagement 1	.26	.05	.00
Social Engagement 1 ↶↷ Social Engagement 2	-.40	.03	.00
Social Engagement 1 ↶↷ Academic engagement 2	.91	.03	.00
Social Engagement 1 ↶↷ Social & Academic Support 2	-.44	.03	.00
Social Engagement 1 ↶↷ Soft Professional Skills 2	-.25	.05	.00
Academic Engagement 1 ↶↷ Academic Engagement 2	.36	.04	.00

Estimate	β	S.E.	p
Academic Engagement 1 ↔ Social Engagement 2	-.33	.04	.00
Academic Engagement 1 ↔ Social & Academic Support 2	.45	.04	.00
Academic Engagement 1 ↔ Soft Professional skills 2	-.42	.04	.00
Social Engagement 2 ↔ Academic engagement 2	-.22	.05	.00
Social Engagement 2 ↔ Social & Academic Support 2	.25	.03	.00
Social Engagement 2 ↔ Sort Professional Skills 2	-.21	.03	.00
Academic Engagement 2 ↔ Social & Academic Support 2	.30	.03	.00
Academic Engagement 2 ↔ Soft Professional skills 2	-.24	.03	.00
Social & Academic Support 2 ↔ Soft Professional Skills	.40	.04	.00
IDEA1 ↔ WKST1	.36	.03	.00
RELG1 ↔ COM1	.21	.03	.00
IDEA2 ↔ WKST2	.33	.03	.00
RELG2 ↔ COM2	.19	.03	.00
AFAM2 ↔ PFAM2	.46	.03	.00
AFRND2 ↔ PFRND2	.18	.02	.00
PFRND2 ↔ AFAM2	.41	.03	.00
Intercepts			

Estimate	β	S.E.	p
SCW1	2.98	.05	.00
TIM1	2.56	.04	.00
FRN1	3.83	.08	.00
ENV1	3.55	.07	.00
WAY1	4.79	.11	.00
WKST1	1.76	.02	.00
IDEA1	1.85	.03	.00
FACL1	2.56	.04	.00
HARD1	1.72	.02	.00
PROJ1	2.25	.04	.00
FRAT1	1.68	.02	.00
HAL1	2.25	.04	.00
CULT1	2.42	.04	.00
TUT1	2.17	.03	.00
COM1	2.58	.04	.00
RELG1	2.03	.03	.00
WKST2	1.77	.02	.00
IDEA2	1.85	.03	.00
FACL2	2.49	.04	.00
HARD2	1.80	.02	.00
PROJ2	2.01	.03	.00
FRAT2	1.56	.02	.00
HAL2	1.77	.02	.00
CULT2	2.24	.04	.00
TUT2	1.84	.02	.00

Estimate	β	S.E.	p
COM2	2.59	.04	.00
RELG2	1.96	.03	.00
PFAM2	1.81	.02	.00
PFRND2	1.97	.03	.00
AFAM2	2.19	.04	.00
AFRND2	2.10	.03	.00
AFAC2	2.13	.03	.00
ANLT2	2.09	.04	.00
INDP2	1.95	.04	.00
ORAL2	1.98	.04	.00
WRIT2	1.92	.03	.00
CHNG2	2.00	.04	.00
Variances			
CHALLENG1	1.00	.00	--
ACADENG1	1.00	.00	--
SOCENG1	1.00	.00	--
ACADENG2	1.00	.00	--
SOCENG2	1.00	.00	--
SUPPORT2	1.00	.00	--
SKILLS	1.00	.00	--
Residual Variances			
SCW1	.17	.07	.01
TIM1	.43	.05	.00
FRN1	.53	.03	.00
ENV1	.44	.04	.00

Estimate	β	S.E.	p
WAY1	.71	.03	.00
WKST1	.63	.03	.00
IDEA1	.58	.02	.00
FACL1	.46	.03	.00
HARD1	.77	.02	.00
PROJ1	.73	.02	.00
FRAT1	.84	.02	.00
HAL1	.76	.02	.00
CULT1	.53	.03	.00
TUT1	.88	.02	.00
COM1	.72	.03	.00
RELG1	.82	.03	.00
WKST2	.61	.03	.00
IDEA2	.51	.02	.00
FACL2	.38	.03	.00
HARD2	.69	.02	.00
PROJ2	.71	.03	.00
FRAT2	.79	.03	.00
HAL2	.78	.03	.00
CULT2	.55	.03	.00
TUT2	.89	.02	.00
COM2	.68	.03	.00
RELG2	.85	.02	.00
PFAM2	.71	.04	.00
PFRND2	.77	.04	.00

Estimate	β	S.E.	p
AFAM2	.80	.03	.00
AFRND2	.76	.03	.00
AFAC2	.66	.04	.00
ANLT2	.58	.03	.00
INDP2	.60	.04	.00
ORAL2	.45	.03	.00
WRIT2	.52	.03	.00
CHNG2	.64	.03	.00
Social Challenges	.55	.05	.00
School Challenges	.78	.03	.00

Table D14
Model Results for The General Effect Model

Estimate	β	S.E.	p
Loading			
Social Challenges → FRN1	.70	.03	.00
Social Challenges → ENV1	.74	.03	.00
Social Challenges → WAY1	.53	.03	.00
School Challenges → SCW1	.97	.07	.00
School Challenges → TIM1	.71	.05	.00

Estimate	β	S.E.	p
Challenges 1 → Social Challenges	.38	.07	.00
Challenges 1 → School Challenges	.25	.05	.00
Academic Engagement 1 → WKST1	.60	.02	.00
Academic Engagement 1 → IDEA1	.65	.02	.00
Academic Engagement 1 → FACL1	.73	.02	.00
Academic Engagement 1 → HARD1	.48	.02	.00
Academic Engagement 1 → PROJ1	.52	.02	.00
Social Engagement 1 → FRAT1	.41	.03	.00
Social Engagement 1 → HAL1	.49	.03	.00
Social Engagement 1 → CULT1	.68	.02	.00
Social Engagement 1 → TUT1	.34	.03	.00
Social Engagement 1 → COM1	.53	.03	.00
Social Engagement 1 → RELG1	.43	.03	.00
Academic Engagement 2 → WKST2	.63	.02	.00
Academic Engagement 2 → IDEA2	.70	.02	.00
Academic Engagement 2 → FACL2	.79	.02	.00
Academic Engagement 2 → HARD2	.56	.02	.00
Academic Engagement 2 → PROJ2	.54	.02	.00
Social Engagement 2 → FRAT2	.45	.03	.00
Social Engagement 2 → HAL2	.47	.03	.00
Social Engagement 2 → CULT2	.67	.02	.00
Social Engagement 2 → TUT2	.33	.03	.00
Social Engagement 2 → COM2	.56	.02	.00
Social Engagement 2 → RELG2	.39	.03	.00
Social & Academic Support 2 → PFAM2	.58	.03	.00

Estimate	β	S.E.	p
Social & Academic Support 2 → AFAM2	.47	.03	.00
Social & Academic Support 2 → AFRND2	.49	.03	.00
Social & Academic Support2 → PFRND2	.50	.04	.00
Social & Academic Support 2 → AFAC2	.54	.03	.00
Soft Professional Skills 2 → ANLT2	.65	.02	.00
Soft Professional Skills 2 → INDP2	.63	.03	.00
Soft Professional Skills 2 → ORAL2	.74	.02	.00
Soft Professional Skills 2 → WRIT2	.69	.02	.00
Soft Professional Skills 2 → CHNG	.60	.03	.00
<u>Direct Effects</u>			
Challenges 1 → Academic Engagement 1	-.50	.06	.00
Challenges 1 → Social Engagement 1	.53	.05	.00
Academic Engagement 1 → Academic Engagement 2	.68	.02	.00
Social Engagement 1 → Social Engagement 2	.91	.02	.00
Challenges 1 → Social & Academic Support 2	-.64	.07	.00
Challenges 1 → Soft Professional Skills 2	-.19	.11	.10
Social Engagement 2 → Sort Professional Skills 2	.00	.05	.94
Academic Engagement 2 → Soft Professional skills 2	.16	.04	.00
Social & Academic Support 2 → Soft Professional Skills 2	.22	.07	.00
<u>Indirect Effects</u>			
Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	.11	.03	.00

Estimate	β	S.E.	p
Challenges 1 → Academic Engagement 1 → Academic Engagement 2	-.34	.05	.00
Challenges 1 → Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	-.05	.01	.00
Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	.00	.04	.94
Challenges 1 → Social & Academic Support 2 → Soft Professional skills 2	-.14	.05	.00
Challenges 1 → Social Engagement 1→ Social Engagement 2	.48	,04	.00
Challenges 1 → Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	.00	.03	.94
<u>Covariances</u>			
Academic Engagement 1 ↶↷ Social Engagement 1	-.30	.05	.00
Academic Engagement 2 ↶↷ Social Engagement 2	-.49	.09	.00
IDEA1 ↶↷ WKST1	.36	.03	.00
RELG1 ↶↷ COM1	.21	.03	.00
IDEA2 ↶↷ WKST2	.33	.03	.00
RELG2 ↶↷ COM2	.19	.03	.00
AFAM2 ↶↷ PFAM2	.44	.03	.00
AFRND2 ↶↷ PFRND2	.40	.03	.00
PFRND2 ↶↷ AFAM2	.19	.02	.00
<u>Intercepts</u>			

Estimate	β	S.E.	p
SCW1	2.98	.05	.00
TIM1	2.56	.04	.00
FRN1	3.84	.08	.00
ENV1	3.56	.07	.00
WAY1	4.79	.11	.00
WKST1	1.76	.02	.00
IDEA1	1.85	.03	.00
FACL1	2.56	.04	.00
HARD1	1.72	.02	.00
PROJ1	2.25	.04	.00
FRAT1	1.68	.02	.00
HAL1	2.25	.04	.00
CULT1	2.42	.04	.00
TUT1	2.17	.03	.00
COM1	2.58	.04	.00
RELG1	2.03	.03	.00
WKST2	1.77	.02	.00
IDEA2	1.84	.03	.00
FACL2	2.48	.04	.00
HARD2	1.80	.02	.00
PROJ2	2.01	.03	.00
FRAT2	1.56	.02	.00
HAL2	1.77	.02	.00
CULT2	2.24	.04	.00
TUT2	1.84	.02	.00

Estimate	β	S.E.	p
COM2	2.59	.04	.00
RELG2	1.96	.03	.00
PFAM2	1.81	.02	.00
PFRND2	1.97	.03	.00
AFAM2	2.19	.04	.00
AFRND2	2.10	.03	.00
AFAC2	2.13	.03	.00
ANLT2	2.10	.04	.00
INDP2	1.95	.04	.00
ORAL2	1.99	.04	.00
WRIT2	1.92	.03	.00
CHNG2	2.00	.04	.00
Variances			
Challenges 1	1.00	.00	--
Residual Variances			
SCW1	.05	.14	.71
TIM1	.50	.08	.00
FRN1	.51	.04	.00
ENV1	.46	.04	.00
WAY1	.72	.03	.00
WKST1	.64	.03	.00
IDEA1	.59	.02	.00
FACL1	.47	.03	.00
HARD1	.77	.02	.00
PROJ1	.73	.02	.00

Estimate	β	S.E.	p
FRAT1	.83	.02	.00
HAL1	.76	.02	.00
CULT1	.53	.03	.00
TUT1	.89	.02	.00
COM1	.72	.03	.00
RELG1	.82	.03	.00
WKST2	.61	.03	.00
IDEA2	.51	.02	.00
FACL2	.38	.03	.00
HARD2	.69	.02	.00
PROJ2	.71	.03	.00
FRAT2	.79	.03	.00
HAL2	.78	.03	.00
CULT2	.55	.03	.00
TUT2	.89	.02	.00
COM2	.69	.03	.00
RELG2	.85	.02	.00
PFAM2	.66	.04	.00
PFRND2	.75	.04	.00
AFAM2	.78	.03	.00
AFRND2	.76	.03	.00
AFAC2	.71	.04	.00
ANLT2	.58	.03	.00
INDP2	.60	.03	.00
ORAL2	.45	.03	.00

Estimate	β	S.E.	p
WRIT2	.52	.03	.00
CHNG2	.64	.03	.00
Social Challenges 1	.86	.05	.00
School Challenges 1	.94	.03	.00
Academic Engagement 1	.75	.06	.00
Social Engagement 1	.72	.05	.00
Academic Engagement 2	.54	.03	.00
Social Engagement 2	.18	.04	.00
Social & Academic Support 2	.59	.09	.00
Soft Professional Skills	.81	.03	.00

Table D15
Model Results for The GMS Metric Invariance

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Loading						
Social Challenges → FRN1	.71	.03	.00	.69	.03	.00
Social Challenges → ENV1	.73	.03	.00	.75	.03	.00
Social Challenges → WAY1	.52	.03	.00	.55	.03	.00
School Challenges → SCW1	.93	.06	.00	.98	.06	.00
School Challenges → TIM1	.71	.05	.00	.74	.05	.00
Challenges 1 → Social Challenges	.45	.14	.00	.36	.09	.00
Challenges 1 → School Challenges	.31	.10	.00	.24	.06	.00
Academic Engagement 1 → WKST1	.61	.02	.00	.59	.03	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Academic Engagement 1 → IDEA1	.64	.02	.00	.64	.02	.00
Academic Engagement 1 → FACL1	.72	.02	.00	.74	.02	.00
Academic Engagement 1 → HARD1	.46	.03	.00	.48	.03	.00
Academic Engagement 1 → PROJ1	.50	.03	.00	.53	.03	.00
Social Engagement 1 → FRAT1	.41	.03	.00	.44	.03	.00
Social Engagement 1 → HAL1	.46	.03	.00	.51	.03	.00
Social Engagement 1 → CULT1	.66	.03	.00	.69	.03	.00
Social Engagement 1 → TUT1	.31	.03	.00	.35	.03	.00
Social Engagement 1 → COM1	.52	.03	.00	.54	.03	.00
Social Engagement 1 → RELG1	.42	.03	.00	.44	.03	.00
Academic Engagement 2 → WKST2	.63	.02	.00	.61	.02	.00
Academic Engagement 2 → IDEA2	.70	.02	.00	.68	.02	.00
Academic Engagement 2 → FACL2	.78	.02	.00	.79	.02	.00
Academic Engagement 2 → HARD2	.56	.02	.00	.55	.02	.00
Academic Engagement 2 → PROJ2	.54	.03	.00	.54	.03	.00
Social Engagement 2 → FRAT2	.45	.03	.00	.48	.03	.00
Social Engagement 2 → HAL2	.46	.03	.00	.49	.03	.00
Social Engagement 2 → CULT2	.65	.03	.00	.66	.03	.00
Social Engagement 2 → TUT2	.30	.03	.00	.33	.03	.00
Social Engagement 2 → COM2	.55	.03	.00	.56	.03	.00
Social Engagement 2 → RELG2	.38	.03	.00	.40	.03	.00
Social & Academic Support 2 → PFAM2	.59	.04	.00	.57	.04	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Social & Academic Support 2 → AFAM2	.48	.04	.00	.48	.03	.00
Social & Academic Support 2 → AFRND2	.48	.03	.00	.49	.04	.00
Social & Academic Support2 → PFRND2	.51	.04	.00	.51	.04	.00
Social & Academic Support 2 → AFAC2	.54	.04	.00	.53	.04	.00
Soft Professional Skills 2 → ANLT2	.65	.03	.00	.65	.03	.00
Soft Professional Skills 2 → INDP2	.63	.03	.00	.63	.03	.00
Soft Professional Skills 2 → ORAL2	.74	.03	.00	.73	.03	.00
Soft Professional Skills 2 → WRIT2	.71	.03	.00	.68	.03	.00
Soft Professional Skills 2 → CHNG	.59	.03	.00	.61	.03	.00
<u>Direct Effects</u>						
Challenges 1 → Academic Engagement 1	-.50	.11	.00	-.49	.08	.00
Challenges 1 → Social Engagement 1	.46	.10	.00	.57	.07	.00
Academic Engagement 1 → Academic Engagement 2	.70	.03	.00	.65	.04	.00
Social Engagement 1 → Social Engagement 2	.89	.04	.00	.92	.03	.00
Challenges 1 → Social & Academic Support 2	-.53	.12	.00	-.71	.09	.00
Challenges 1 → Soft Professional Skills 2	.03	.07	.73	-.02	.09	.85

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Social Engagement 2 → Sort Professional Skills 2	.10	.06	.11	.20	.06	.00
Academic Engagement 2 → Soft Professional skills 2	.26	.08	.00	.21	.14	.14
Social & Academic Support 2 → Soft Professional Skills 2	-.21	.13	.10	-.11	.22	.61
<u>Indirect Effects</u>						
Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	.07	.04	.11	.13	.04	.00
Challenges 1 → Academic Engagement 1 → Academic Engagement 2	-.35	.08	.00	-.32	.06	.00
Challenges 1 → Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	-.03	.02	.06	-.06	.02	.00
Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	.02	.06	.73	-.02	.08	.85
Challenges 1 → Social & Academic Support 2 → Soft Professional skills 2	-.14	.04	.00	-.15	.10	.15
Challenges 1 → Social Engagement 1→ Social Engagement 2	-.35	.08	.00	.53	.07	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Challenges 1 → Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	.01	.03	.74	-.01	.05	.85
Covariances						
Academic Engagement 1 ↶↷ Social Engagement 1	-.24	.10	.02	-.33	.07	.00
Academic Engagement 2 ↶↷ Social Engagement 2	-.42	.12	.00	-.54	.13	.00
IDEA1 ↶↷ WKST1	.40	.04	.00	.32	.04	.00
RELG1 ↶↷ COM1	.13	.04	.00	.28	.04	.00
IDEA2 ↶↷ WKST2	.33	.04	.00	.32	.05	.00
RELG2 ↶↷ COM2	.14	.04	.00	.25	.04	.00
AFAM2 ↶↷ PFAM2	.46	.04	.00	.41	.04	.00
AFRND2 ↶↷ PFRND2	.44	.04	.00	.38	.04	.00
PFRND2 ↶↷ AFAM2	.19	.03	.00	.18	.03	.00
Intercepts						
SCW1	2.96	.07	.00	2.99	.07	.00
TIM1	2.53	.05	.00	2.58	.06	.00
FRN1	3.92	.12	.00	3.75	.12	.00
ENV1	3.50	.10	.00	3.63	.11	.00
WAY1	4.66	.15	.00	4.94	.16	.00
WKST1	1.76	.04	.00	1.79	.03	.00
IDEA1	1.84	.04	.00	1.88	.04	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
FACL1	2.54	.05	.00	2.60	.06	.00
HARD1	1.69	.03	.00	1.76	.03	.00
PROJ1	2.23	.05	.00	2.29	.06	.00
FRAT1	1.71	.03	.00	1.66	.03	.00
HAL1	2.32	.05	.00	2.18	.05	.00
CULT1	2.69	.06	.00	2.22	.05	.00
TUT1	2.29	.05	.00	2.07	.04	.00
COM1	2.82	.06	.00	2.37	.05	.00
RELG1	2.14	.04	.00	1.93	.04	.00
WKST2	1.72	.03	.00	1.86	.04	.00
IDEA2	1.79	.04	.00	1.94	.04	.00
FACL2	2.44	.05	.00	2.54	.06	.00
HARD2	1.81	.04	.00	1.80	.04	.00
PROJ2	1.99	.05	.00	2.03	.05	.00
FRAT2	1.58	.03	.00	1.55	.03	.00
HAL2	1.86	.04	.00	1.69	.03	.00
CULT2	2.53	.06	.00	2.02	.04	.00
TUT2	1.92	.04	.00	1.76	.03	.00
COM2	2.79	.07	.00	2.40	.06	.00
RELG2	2.01	.04	.00	1.92	.04	.00
PFAM2	1.81	.03	.00	1.82	.03	.00
PFRND2	2.00	.04	.00	1.94	.04	.00
AFAM2	2.21	.05	.00	2.18	.05	.00
AFRND2	2.06	.04	.00	2.14	.05	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
AFAC2	2.08	.04	.00	2.19	.05	.00
ANLT2	2.11	.05	.00	2.09	.06	.00
INDP2	1.96	.06	.00	1.95	.06	.00
ORAL2	2.01	.05	.00	1.99	.05	.00
WRIT2	1.98	.05	.00	1.88	.05	.00
CHNG2	1.99	.05	.00	2.03	.05	.00
Residual Variances						
SCW1	.13	.11	.26	.05	.12	.70
TIM1	.49	.07	.00	.45	.07	.00
FRN1	.50	.04	.00	.52	.04	.00
ENV1	.47	.05	.00	.45	.05	.00
WAY1	.73	.03	.00	.70	.03	.00
WKST1	.63	.03	.00	.66	.03	.00
IDEA1	.59	.03	.00	.59	.03	.00
FACL1	.49	.03	.00	.46	.03	.00
HARD1	.79	.02	.00	.77	.03	.00
PROJ1	.75	.03	.00	.72	.03	.00
FRAT1	.83	.02	.00	.81	.03	.00
HAL1	.79	.02	.00	.74	.03	.00
CULT1	.57	.03	.00	.53	.04	.00
TUT1	.90	.02	.00	.88	.02	.00
COM1	.73	.03	.00	.71	.03	.00
RELG1	.82	.03	.00	.80	.03	.00
WKST2	.61	.03	.00	.63	.03	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
IDEA2	.51	.03	.00	.53	.03	.00
FACL2	.39	.03	.00	.38	.03	.00
HARD2	.69	.03	.00	.70	.03	.00
PROJ2	.71	.03	.00	.71	.03	.00
FRAT2	.79	.03	.00	.77	.03	.00
HAL2	.79	.03	.00	.76	.03	.00
CULT2	.58	.04	.00	.56	.04	.00
TUT2	.91	.02	.00	.89	.02	.00
COM2	.69	.03	.00	.69	.03	.00
RELG2	.86	.03	.00	.84	.03	.00
PFAM2	.65	.04	.00	.68	.04	.00
PFRND2	.74	.04	.00	.74	.04	.00
AFAM2	.77	.03	.00	.77	.03	.00
AFRND2	.77	.03	.00	.77	.04	.00
AFAC2	.71	.04	.00	.72	.04	.00
ANLT2	.58	.04	.00	.58	.04	.00
INDP2	.60	.04	.00	.60	.04	.00
ORAL2	.45	.04	.00	.47	.04	.00
WRIT2	.49	.04	.00	.54	.04	.00
CHNG2	.65	.04	.00	.63	.04	.00
Social Challenges 1	.80	.13	.00	.87	.06	.00
School Challenges 1	.90	.06	.00	.94	.03	.00
Academic Engagement 1	.75	.11	.00	.76	.08	.00
Social Engagement 1	.79	.10	.00	.67	.08	.00

Effects	Scholars			Non-scholars		
	β	SE	p	β	SE	p
Academic Engagement 2	.51	.05	.00	.58	.05	.00
Social Engagement 2	.21	.06	.00	.16	.06	.01
Social & Academic Support 2	.72	.12	.00	.50	.13	.00
Soft Professional Skills	.80	.05	.00	.83	.04	.00

Table D16

Model Results for Parents' Education Metric Invariance

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
Loading						
Social Challenges → FRN1	.69	.03	.00	.71	.03	.00
Social Challenges → ENV1	.73	.03	.00	.75	.04	.00
Social Challenges → WAY1	.52	.03	.00	.55	.04	.00
School Challenges → SCW1	1.00	.08	.00	.95	.08	.00
School Challenges → TIM1	.71	.06	.00	.70	.06	.00
Challenges 1 → Social Challenges	.41	.10	.00	.33	.09	.00
Challenges 1 → School Challenges	.26	.07	.00	.23	.07	.00
Academic Engagement 1 → WKST1	.60	.02	.00	.61	.03	.00
Academic Engagement 1 → IDEA1	.64	.02	.00	.64	.02	.00
Academic Engagement 1 → FACL1	.72	.02	.00	.74	.02	.00
Academic Engagement 1 → HARD1	.47	.03	.00	.48	.03	.00
Academic Engagement 1 → PROJ1	.52	.03	.00	.52	.03	.00

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
Social Engagement 1 → FRAT1	.43	.03	.00	.38	.03	.00
Social Engagement 1 → HAL1	.50	.03	.00	.47	.03	.00
Social Engagement 1 → CULT1	.70	.02	.00	.65	.03	.00
Social Engagement 1 → TUT1	.35	.03	.00	.34	.03	.00
Social Engagement 1 → COM1	.54	.03	.00	.52	.03	.00
Social Engagement 1 → RELG1	.44	.03	.00	.41	.03	.00
Academic Engagement 2 → WKST2	.63	.02	.00	.62	.02	.00
Academic Engagement 2 → IDEA2	.70	.02	.00	.70	.02	.00
Academic Engagement 2 → FACL2	.79	.02	.00	.78	.02	.00
Academic Engagement 2 → HARD2	.56	.02	.00	.54	.03	.00
Academic Engagement 2 → PROJ2	.53	.02	.00	.55	.03	.00
Social Engagement 2 → FRAT2	.48	.03	.00	.42	.03	.00
Social Engagement 2 → HAL2	.49	.03	.00	.45	.03	.00
Social Engagement 2 → CULT2	.69	.03	.00	.63	.03	.00
Social Engagement 2 → TUT2	.34	.03	.00	.32	.03	.00
Social Engagement 2 → COM2	.58	.03	.00	.53	.03	.00
Social Engagement 2 → RELG2	.40	.03	.00	.35	.03	.00
Social & Academic Support 2 → PFAM2	.57	.04	.00	.60	.04	.00
Social & Academic Support 2 → AFAM2	.46	.03	.00	.49	.04	.00
Social & Academic Support 2 → AFRND2	.48	.03	.00	.51	.04	.00
Social & Academic Support2 → PFRND2	.48	.04	.00	.54	.04	.00
Social & Academic Support 2 → AFAC2	.52	.04	.00	.57	.04	.00
Soft Professional Skills 2 → ANLT2	.65	.03	.00	.66	.03	.00

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
Soft Professional Skills 2 → INDP2	.64	.03	.00	.62	.04	.00
Soft Professional Skills 2 → ORAL2	.75	.03	.00	.72	.03	.00
Soft Professional Skills 2 → WRIT2	.72	.02	.00	.66	.03	.00
Soft Professional Skills 2 → CHNG	.62	.03	.00	.58	.04	.00
Direct Effects						
Challenges 1 → Academic Engagement 1	-.47	.08	.00	-.56	.08	.00
Challenges 1 → Social Engagement 1	.50	.08	.00	.55	.07	.00
Academic Engagement 1 → Academic Engagement 2	.66	.03	.00	.72	.04	.00
Social Engagement 1 → Social Engagement 2	.87	.03	.00	.97	.04	.00
Challenges 1 → Social & Academic Support 2	-.61	.09	.00	-.69	.09	.00
Challenges 1 → Soft Professional Skills 2	-.02	.07	.71	.04	.10	.67
Social Engagement 2 → Sort Professional Skills 2	.11	.05	.03	.23	.07	.00
Academic Engagement 2 → Soft Professional skills 2	.30	.09	.00	.11	.15	.49
Social & Academic Support 2 → Soft Professional Skills 2	-.15	.14	.27	-.22	.25	.37
Indirect Effects						
Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	.07	.03	.03	.16	.05	.00
Challenges 1 → Academic Engagement 1 → Academic Engagement 2	-.31	.06	.00	-.40	.07	.00

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
Challenges 1 → Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	-.03	.02	.02	-.09	.03	.00
Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	-.02	.06	.71	.04	.09	.67
Challenges 1 → Social & Academic Support 2 → Soft Professional skills 2	-.18	.06	.00	-.07	.11	.50
Challenges 1 → Social Engagement 1→ Social Engagement 2	.44	.07	.00	.53	.07	.00
Challenges 1 → Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	-.01	.03	.70	.02	.05	.67
<u>Covariances</u>						
Academic Engagement 1 ↶↷ Social Engagement 1	-.34	.07	.00	-.23	.09	.02
Academic Engagement 2 ↶↷ Social Engagement 2	-.37	.08	.00	-1.03	.65	.12
IDEA1 ↶↷ WKST1	.33	.04	.00	.41	.05	.00
RELG1 ↶↷ COM1	.21	.04	.00	.21	.04	.00
IDEA2 ↶↷ WKST2	.38	.04	.00	.26	.05	.00
RELG2 ↶↷ COM2	.20	.04	.00	.19	.05	.00
AFAM2 ↶↷ PFAM2	.41	.04	.00	.49	.04	.00
AFRND2 ↶↷ PFRND2	.42	.04	.00	.38	.05	.00

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
PFRND2 ↔ AFAM2	.19	.03	.00	.20	.04	.00
Intercepts						
SCW1	2.93	.06	.00	3.05	.08	.00
TIM1	2.48	.05	.00	2.69	.07	.00
FRN1	3.81	.11	.00	3.89	.13	.00
ENV1	3.52	.09	.00	3.62	.12	.00
WAY1	4.70	.14	.00	4.93	.17	.00
WKST1	1.78	.03	.00	1.75	.04	.00
IDEA1	1.88	.03	.00	1.81	.04	.00
FACL1	2.55	.05	.00	2.58	.06	.00
HARD1	1.72	.03	.00	1.72	.04	.00
PROJ1	2.35	.05	.00	2.12	.06	.00
FRAT1	1.70	.03	.00	1.67	.03	.00
HAL1	2.20	.04	.00	2.33	.06	.00
CULT1	2.45	.05	.00	2.38	.06	.00
TUT1	2.23	.04	.00	2.11	.05	.00
COM1	2.58	.05	.00	2.58	.06	.00
RELG1	1.99	.04	.00	2.11	.05	.00
WKST2	1.78	.03	.00	1.75	.04	.00
IDEA2	1.85	.03	.00	1.83	.04	.00
FACL2	2.53	.05	.00	2.41	.06	.00
HARD2	1.82	.03	.00	1.79	.04	.00
PROJ2	2.03	.04	.00	1.97	.05	.00

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
FRAT2	1.55	.02	.00	1.58	.03	.00
HAL2	1.73	.03	.00	1.84	.04	.00
CULT2	2.23	.04	.00	2.25	.06	.00
TUT2	1.87	.03	.00	1.79	.04	.00
COM2	2.58	.06	.00	2.59	.07	.00
RELG2	1.93	.04	.00	2.03	.05	.00
PFAM2	1.86	.03	.00	1.74	.04	.00
PFRND2	1.97	.04	.00	1.97	.04	.00
AFAM2	2.30	.05	.00	2.06	.05	.00
AFRND2	2.09	.04	.00	2.10	.05	.00
AFAC2	2.13	.04	.00	2.13	.05	.00
ANLT2	2.09	.05	.00	2.11	.06	.00
INDP2	1.96	.05	.00	1.94	.06	.00
ORAL2	2.01	.05	.00	1.95	.05	.00
WRIT2	1.95	.04	.00	1.88	.05	.00
CHNG2	2.02	.05	.00	1.99	.06	.00
Residual Variances						
SCW1	.01	.15	.95	.09	.14	.51
TIM1	.49	.08	.00	.52	.08	.00
FRN1	.53	.04	.00	.50	.04	.00
ENV1	.47	.04	.00	.43	.06	.00
WAY1	.73	.03	.00	.69	.04	.00
WKST1	.64	.03	.00	.63	.03	.00

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
IDEA1	.59	.03	.00	.59	.03	.00
FACL1	.48	.03	.00	.45	.03	.00
HARD1	.78	.02	.00	.77	.03	.00
PROJ1	.73	.03	.00	.74	.03	.00
FRAT1	.81	.03	.00	.86	.02	.00
HAL1	.75	.03	.00	.78	.03	.00
CULT1	.50	.03	.00	.58	.04	.00
TUT1	.88	.02	.00	.88	.02	.00
COM1	.71	.03	.00	.73	.03	.00
RELG1	.81	.03	.00	.83	.03	.00
WKST2	.60	.03	.00	.61	.03	.00
IDEA2	.51	.03	.00	.51	.03	.00
FACL2	.38	.03	.00	.39	.03	.00
HARD2	.68	.03	.00	.71	.03	.00
PROJ2	.72	.03	.00	.70	.03	.00
FRAT2	.77	.03	.00	.82	.03	.00
HAL2	.76	.03	.00	.80	.03	.00
CULT2	.52	.04	.00	.61	.04	.00
TUT2	.89	.02	.00	.90	.02	.00
COM2	.67	.03	.00	.72	.03	.00
RELG2	.84	.03	.00	.88	.02	.00
PFAM2	.68	.04	.00	.64	.05	.00
PFRND2	.77	.03	.00	.70	.05	.00

Effects	Less Educated			At Least Bachelors		
	β	SE	p	β	SE	p
AFAM2	.79	.03	.00	.76	.04	.00
AFRND2	.77	.03	.00	.74	.04	.00
AFAC2	.73	.04	.00	.67	.04	.00
ANLT2	.58	.03	.00	.57	.04	.00
INDP2	.59	.04	.00	.61	.05	.00
ORAL2	.43	.04	.00	.48	.04	.00
WRIT2	.48	.04	.00	.57	.04	.00
CHNG2	.62	.04	.00	.66	.04	.00
Social Challenges 1	.84	.08	.00	.89	.06	.00
School Challenges 1	.93	.04	.00	.95	.03	.00
Academic Engagement 1	.78	.07	.00	.69	.09	.00
Social Engagement 1	.75	.08	.00	.70	.08	.00
Academic Engagement 2	.57	.04	.00	.48	.05	.00
Social Engagement 2	.24	.05	.00	.06	.08	.45
Social & Academic Support 2	.63	.11	.00	.52	.12	.00
Soft Professional Skills	.79	.04	.00	.82	.06	.00

Table D17
Model Results for the Race Metric Invariance

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Loading									
Social Challenges → FRN1	.67	.03	.00	.68	.03	.00	.68	.03	.00
Social Challenges → ENV1	.75	.04	.00	.74	.04	.00	.78	.04	.00
Social Challenges → WAY1	.55	.03	.00	.52	.04	.00	.53	.03	.00
School Challenges → SCW1	.91	.05	.00	.95	.05	.00	.94	.05	.00
School Challenges → TIM1	.72	.04	.00	.75	.05	.00	.74	.05	.00
Challenges 1 → Social Challenges	.44	.08	.00	.39	.17	.02	.67	.06	.00
Challenges 1 → School Challenges	.29	.06	.00	.27	.12	.03	.47	.05	.00
Academic Engagement 1 → WKST1	.61	.03	.00	.62	.03	.00	.62	.03	.00
Academic Engagement 1 → IDEA1	.64	.03	.00	.67	.02	.00	.64	.03	.00
Academic Engagement 1 → FACL1	.73	.03	.00	.75	.02	.00	.70	.03	.00
Academic Engagement 1 → HARD1	.46	.03	.00	.48	.03	.00	.47	.03	.00
Academic Engagement 1 → PROJ1	.52	.03	.00	.53	.03	.00	.50	.03	.00
Social Engagement 1 → FRAT1	.39	.03	.00	.38	.03	.00	.38	.03	.00
Social Engagement 1 → HAL1	.51	.03	.00	.46	.03	.00	.46	.03	.00

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Social Engagement 1 → CULT1	.73	.03	.00	.63	.03	.00	.66	.03	.00
Social Engagement 1 → TUT1	.36	.03	.00	.35	.03	.00	.35	.03	.00
Social Engagement 1 → COM1	.57	.03	.00	.54	.03	.00	.56	.03	.00
Social Engagement 1 → RELG1	.42	.04	.00	.37	.03	.00	.38	.03	.00
Academic Engagement 2 → WKST2	.60	.03	.00	.65	.02	.00	.63	.03	.00
Academic Engagement 2 → IDEA2	.68	.03	.00	.74	.02	.00	.70	.02	.00
Academic Engagement 2 → FACL2	.74	.02	.00	.82	.02	.00	.81	.02	.00
Academic Engagement 2 → HARD2	.53	.03	.00	.59	.03	.00	.56	.03	.00
Academic Engagement 2 → PROJ2	.51	.03	.00	.56	.03	.00	.54	.03	.00
Social Engagement 2 → FRAT2	.42	.04	.00	.42	.03	.00	.44	.03	.00
Social Engagement 2 → HAL2	.46	.03	.00	.44	.04	.00	.48	.03	.00
Social Engagement 2 → CULT2	.72	.03	.00	.58	.03	.00	.66	.03	.00
Social Engagement 2 → TUT2	.36	.03	.00	.31	.03	.00	.32	.03	.00
Social Engagement 2 → COM2	.63	.03	.00	.50	.03	.00	.60	.03	.00

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Social Engagement 2 → RELG2	.36	.04	.00	.28	.03	.00	.35	.04	.00
Social & Academic Support 2 → PFAM2	.61	.03	.00	.56	.04	.00	.59	.05	.00
Social & Academic Support 2 → AFAM2	.48	.03	.00	.47	.04	.00	.45	.04	.00
Social & Academic Support 2 → AFRND2	.53	.04	.00	.53	.04	.00	.50	.04	.00
Social & Academic Support2 → PFRND2	.55	.04	.00	.54	.05	.00	.51	.04	.00
Social & Academic Support 2 → AFAC2	.56	.04	.00	.51	.04	.00	.49	.04	.00
Soft Professional Skills 2 → ANLT2	.67	.03	.00	.66	.03	.00	.61	.03	.00
Soft Professional Skills 2 → INDP2	.64	.04	.00	.67	.04	.00	.59	.03	.00
Soft Professional Skills 2 → ORAL2	.78	.03	.00	.75	.03	.00	.68	.03	.00
Soft Professional Skills 2 → WRIT2	.74	.03	.00	.67	.03	.00	.66	.04	.00
Soft Professional Skills 2 → CHNG	.61	.03	.00	.65	.03	.00	.56	.04	.00
<u>Direct Effects</u>									

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Challenges 1 → Academic Engagement 1	-.49	.07	.00	-.57	.14	.00	-.09	.10	.36
Challenges 1 → Social Engagement 1	.45	.08	.00	.52	.10	.00	.09	.10	.37
Academic Engagement 1 → Academic Engagement 2	.70	.04	.00	.67	.04	.00	.65	.04	.00
Social Engagement 1 → Social Engagement 2	.82	.04	.00	.95	.05	.00	.90	.04	.00
Challenges 1 → Social & Academic Support 2	-.69	.10	.00	-.59	.12	.00	-.10	.12	.41
Challenges 1 → Soft Professional Skills 2	.02	.08	.79	-.04	.09	.64	-.07	.06	.22
Social Engagement 2 → Sort Professional Skills 2	.08	.08	.30	.21	.07	.01	.15	.06	.01
Academic Engagement 2 → Soft Professional skills 2	.03	.18	.85	.14	.10	.17	.35	.07	.00
Social & Academic Support 2 → Soft Professional Skills 2	-.53	.22	.02	-.12	.18	.49	-.01	.08	.93
<u>Indirect Effects</u>									
Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	.06	.05	.30	.14	.05	.00	.10	.04	.01

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Challenges 1 → Academic Engagement 1 → Academic Engagement 2	-.34	.05	.00	-.38	.11	.00	-.06	.06	.36
Challenges 1 → Academic Engagement 1 → Academic Engagement 2 → Soft Professional skills 2	-.03	.03	.28	-.08	.03	.02	-.01	.01	.37
Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	.02	.07	.79	-.04	.08	.64	-.06	.05	.22
Challenges 1 → Social & Academic Support 2 → Soft Professional skills 2	-.02	.12	.85	-.08	.06	.19	-.04	.04	.41
Challenges 1 → Social Engagement 1→ Social Engagement 2	.37	.07	.00	.50	.10	.00	.08	.09	.38
Challenges 1 → Social Engagement 1→ Social Engagement 2 → Soft Professional skills 2	.01	.03	.79	-.02	.04	.64	-.01	.01	.47
<u>Covariances</u>									
Academic Engagement 1 ↶↷ Social Engagement 1	-.39	.07	.00	-.35	.12	.00	-.43	.06	.00

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Academic Engagement 2 ↷									
Social Engagement 2	-.48	.11	.00	-.84	.38	.03	-.33	.13	.01
IDEA1 ↷ WKST1	.35	.05	.00	.42	.05	.00	.28	.05	.00
RELG1 ↷ COM1	.24	.05	.00	.18	.05	.00	.27	.05	.00
IDEA2 ↷ WKST2	.33	.05	.00	.34	.05	.00	.32	.05	.00
RELG2 ↷ COM2	.19	.05	.00	.23	.05	.00	.26	.05	.00
AFAM2 ↷ PFAM2	.45	.04	.00	.48	.05	.00	.38	.05	.00
AFRND2 ↷ PFRND2	.34	.05	.00	.40	.05	.00	.41	.05	.00
PFRND2 ↷ AFAM2	.22	.04	.00	.15	.04	.00	.20	.04	.00
Intercepts									
SCW1	3.18	.10	.00	2.93	.08	.00	2.98	.09	.00
TIM1	2.68	.07	.00	2.57	.07	.00	2.49	.06	.00
FRN1	4.00	.16	.00	3.80	.14	.00	3.76	.13	.00
ENV1	3.58	.13	.00	3.51	.13	.00	3.58	.13	.00
WAY1	5.11	.18	.00	4.67	.17	.00	4.68	.19	.00
WKST1	1.79	.04	.00	1.66	.04	.00	1.86	.05	.00
IDEA1	1.86	.04	.00	1.89	.05	.00	1.82	.04	.00
FACL1	2.51	.07	.00	2.61	.07	.00	2.57	.07	.00
HARD1	1.62	.04	.00	1.77	.04	.00	1.79	.04	.00
PROJ1	2.18	.07	.00	2.27	.07	.00	2.32	.07	.00
FRAT1	1.96	.05	.00	1.56	.03	.00	1.62	.04	.00
HAL1	2.60	.07	.00	2.14	.06	.00	2.10	.06	.00
CULT1	2.93	.09	.00	2.21	.06	.00	2.31	.06	.00

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
TUT1	2.22	.06	.00	2.10	.05	.00	2.20	.06	.00
COM1	2.61	.07	.00	2.53	.07	.00	2.60	.07	.00
RELG1	2.49	.07	.00	1.81	.04	.00	1.94	.05	.00
WKST2	1.81	.04	.00	1.72	.04	.00	1.78	.04	.00
IDEA2	1.94	.04	.00	1.85	.04	.00	1.75	.04	.00
FACL2	2.43	.06	.00	2.50	.07	.00	2.51	.07	.00
HARD2	1.72	.04	.00	1.86	.05	.00	1.83	.05	.00
PROJ2	2.02	.06	.00	1.98	.06	.00	2.02	.06	.00
FRAT2	1.86	.05	.00	1.47	.03	.00	1.50	.03	.00
HAL2	1.86	.05	.00	1.77	.04	.00	1.72	.04	.00
CULT2	2.67	.08	.00	2.08	.05	.00	2.09	.05	.00
TUT2	1.98	.05	.00	1.79	.04	.00	1.76	.04	.00
COM2	2.72	.08	.00	2.45	.07	.00	2.60	.08	.00
RELG2	2.43	.07	.00	1.72	.04	.00	1.92	.05	.00
PFAM2	1.77	.04	.00	1.92	.05	.00	1.80	.04	.00
PFRND2	1.98	.05	.00	1.95	.05	.00	1.99	.05	.00
AFAM2	2.09	.06	.00	2.33	.07	.00	2.20	.06	.00
AFRND2	2.15	.05	.00	2.06	.05	.00	2.09	.05	.00
AFAC2	2.09	.05	.00	2.22	.06	.00	2.10	.06	.00
ANLT2	2.07	.06	.00	2.10	.07	.00	2.13	.07	.00
INDP2	1.93	.06	.00	1.98	.07	.00	1.97	.07	.00
ORAL2	1.94	.06	.00	2.03	.06	.00	2.02	.06	.00
WRIT2	1.90	.05	.00	1.90	.06	.00	1.99	.06	.00
CHNG2	1.88	.06	.00	2.12	.06	.00	2.03	.08	.00

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
Residual Variances									
SCW1	.17	.10	.09	.11	.10	.30	.11	.10	.27
TIM1	.48	.06	.00	.44	.07	.00	.46	.07	.00
FRN1	.55	.05	.00	.54	.05	.00	.54	.04	.00
ENV1	.43	.06	.00	.45	.05	.00	.39	.06	.00
WAY1	.70	.03	.00	.73	.04	.00	.72	.04	.00
WKST1	.63	.03	.00	.62	.03	.00	.62	.04	.00
IDEA1	.59	.03	.00	.56	.03	.00	.59	.03	.00
FACL1	.46	.04	.00	.45	.03	.00	.51	.04	.00
HARD1	.79	.03	.00	.77	.03	.00	.78	.03	.00
PROJ1	.73	.03	.00	.72	.03	.00	.75	.03	.00
FRAT1	.85	.03	.00	.85	.03	.00	.85	.02	.00
HAL1	.74	.03	.00	.79	.03	.00	.79	.03	.00
CULT1	.47	.04	.00	.61	.04	.00	.56	.04	.00
TUT1	.87	.02	.00	.88	.02	.00	.88	.02	.00
COM1	.67	.03	.00	.71	.03	.00	.69	.04	.00
RELG1	.82	.03	.00	.86	.03	.00	.86	.03	.00
WKST2	.64	.03	.00	.58	.03	.00	.60	.03	.00
IDEA2	.54	.04	.00	.46	.03	.00	.51	.03	.00
FACL2	.46	.03	.00	.33	.03	.00	.35	.04	.00
HARD2	.72	.03	.00	.66	.03	.00	.69	.03	.00
PROJ2	.74	.03	.00	.69	.03	.00	.71	.03	.00
FRAT2	.82	.03	.00	.82	.03	.00	.80	.03	.00
HAL2	.79	.03	.00	.80	.03	.00	.77	.03	.00

Effects	African			Indian/Asian			Hispanic		
	β	S.E	p	β	S.E	p	β	S.E	p
CULT2	.48	.04	.00	.67	.04	.00	.57	.04	.00
TUT2	.87	.02	.00	.91	.02	.00	.90	.02	.00
COM2	.61	.04	.00	.75	.03	.00	.64	.04	.00
RELG2	.87	.03	.00	.92	.02	.00	.88	.03	.00
PFAM2	.62	.04	.00	.69	.05	.00	.66	.05	.00
PFRND2	.70	.05	.00	.70	.05	.00	.74	.04	.00
AFAM2	.77	.03	.00	.78	.03	.00	.80	.04	.00
AFRND2	.72	.04	.00	.73	.04	.00	.76	.04	.00
AFAC2	.69	.05	.00	.74	.04	.00	.76	.04	.00
ANLT2	.55	.04	.00	.57	.04	.00	.63	.04	.00
INDP2	.59	.05	.00	.55	.05	.00	.65	.04	.00
ORAL2	.39	.04	.00	.44	.05	.00	.55	.05	.00
WRIT2	.46	.05	.00	.55	.04	.00	.56	.05	.00
CHNG2	.63	.04	.00	.58	.04	.00	.69	.04	.00
Social Challenges 1	.81	.07	.00	.85	.14	.00	.55	.08	.00
School Challenges 1	.91	.03	.00	.93	.06	.00	.78	.05	.00
Academic Engagement 1	.76	.07	.00	.68	.16	.00	.99	.02	.00
Social Engagement 1	.80	.07	.00	.73	.11	.00	.99	.02	.00
Academic Engagement 2	.51	.06	.00	.55	.06	.00	.57	.06	.00
Social Engagement 2	.33	.07	.00	.10	.09	.26	.19	.07	.01
Social & Academic Support 2	.52	.14	.00	.66	.14	.00	.99	.03	.00
Soft Professional Skills	.67	.10	.00	.85	.04	.00	.84	.05	.00